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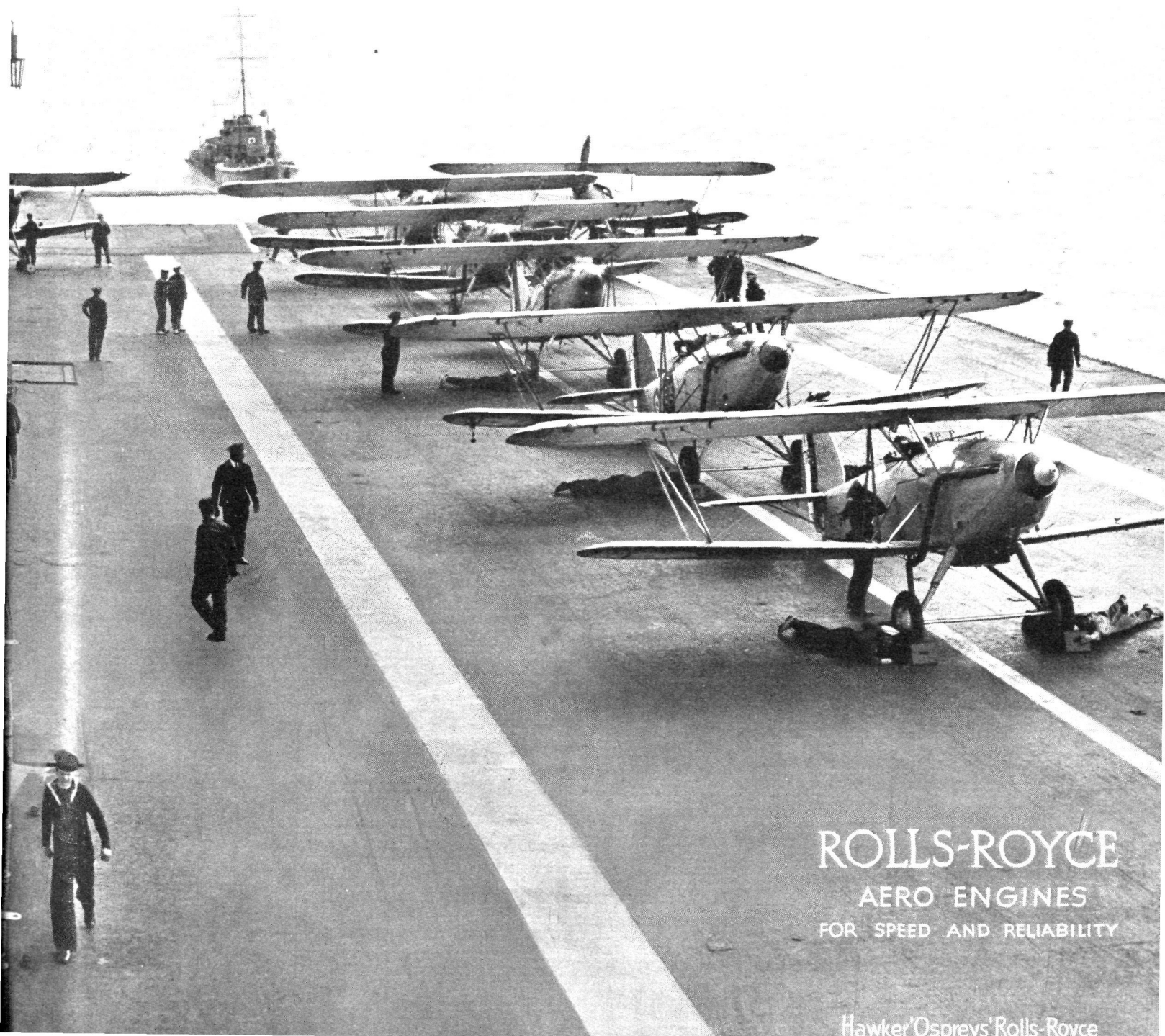
# FLIGHT

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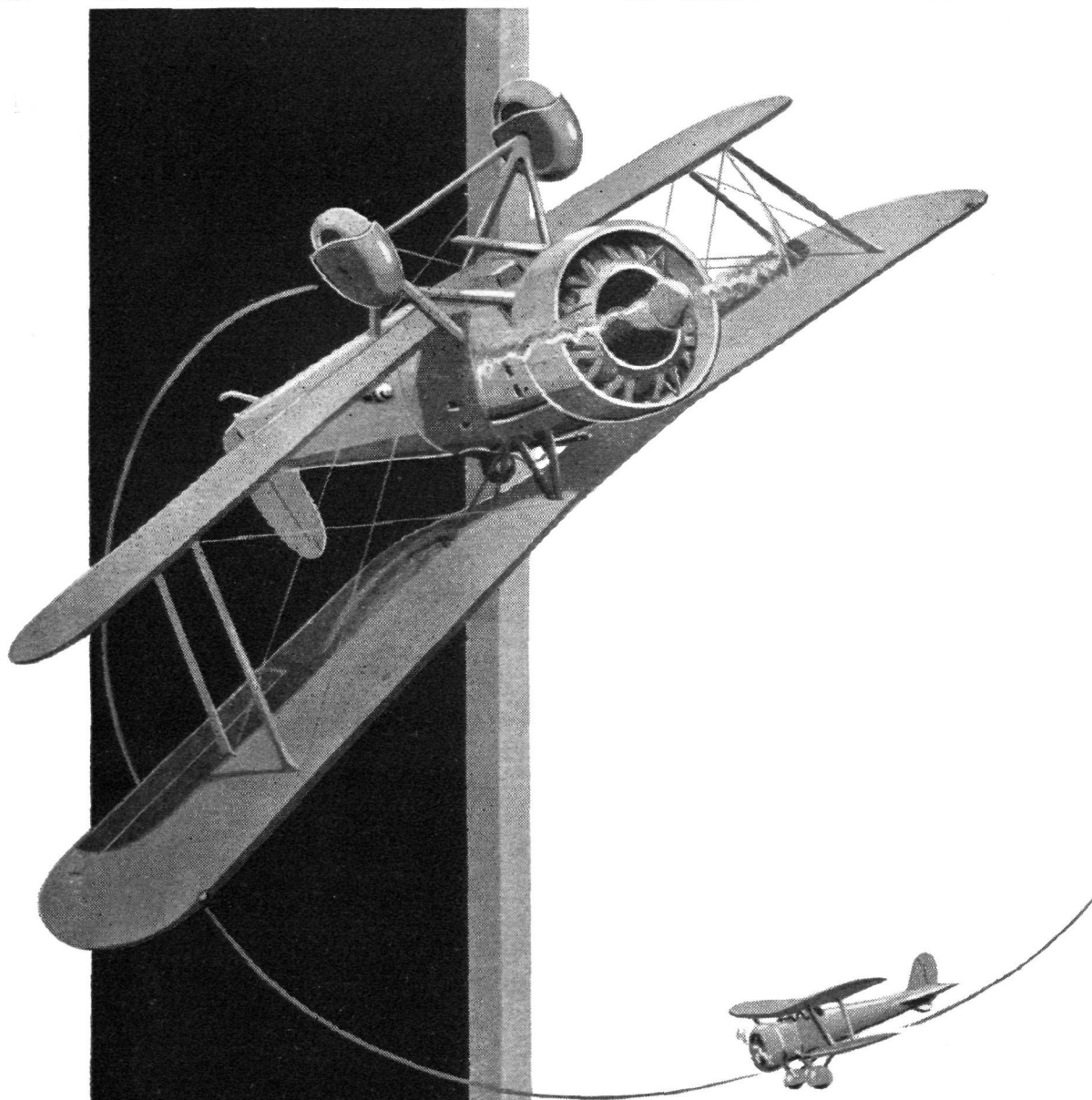
No. 1287  
vol. XXV  
No. 34



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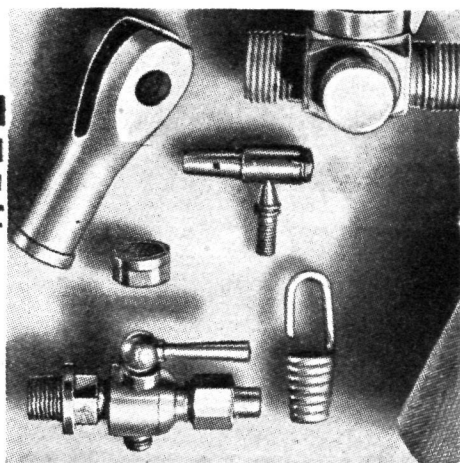
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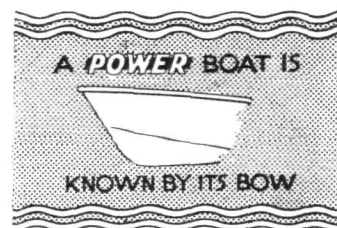
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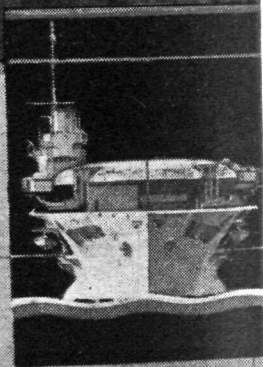
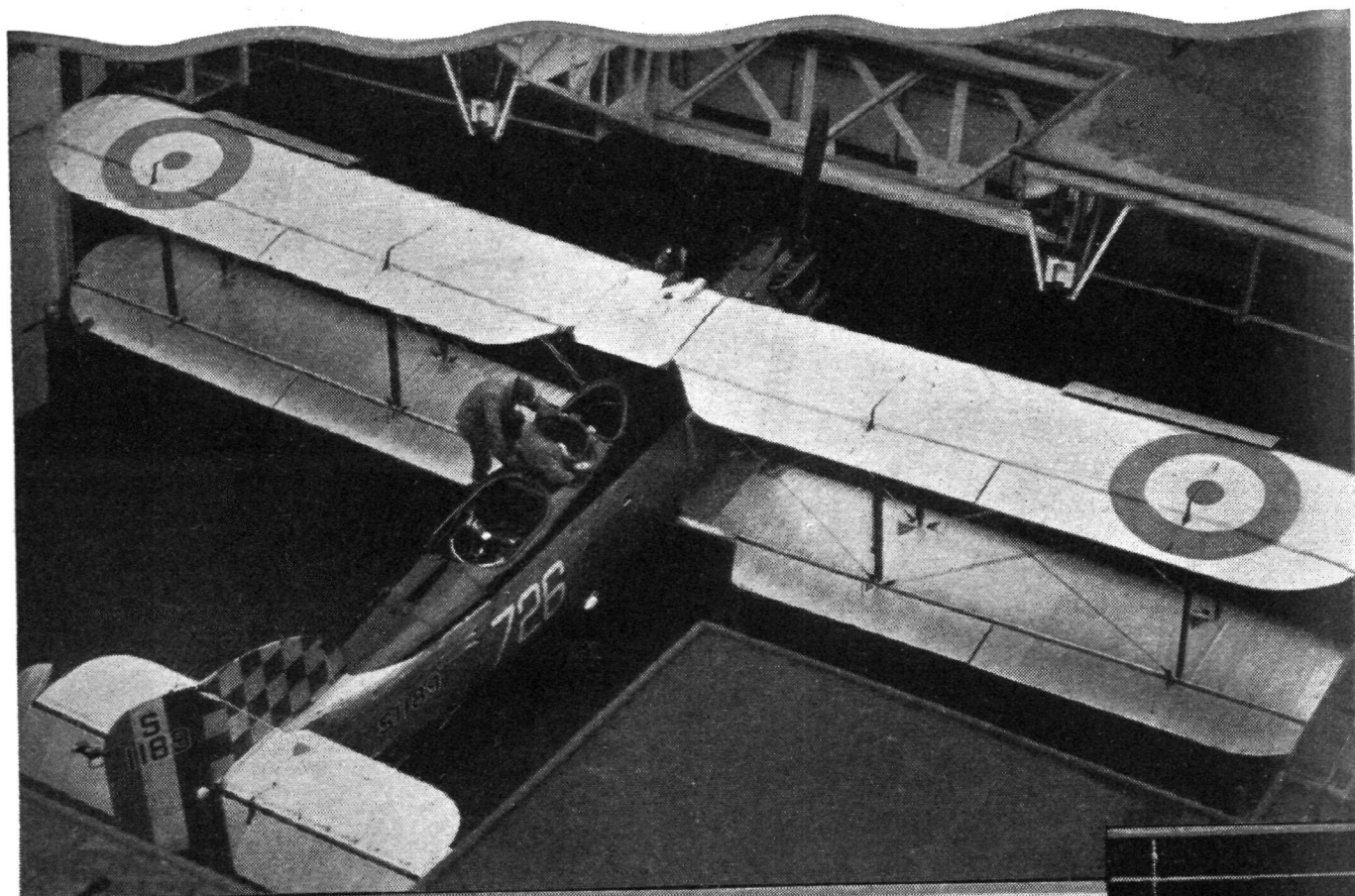
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# FLIGHT

The  
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First Aeronautical Weekly in the World. Founded January, 1909

Founder and Editor: STANLEY SPOONER

A Journal devoted to the Interests, Practice and Progress of Aerial Locomotion and Transport  
OFFICIAL ORGAN OF THE ROYAL AERO CLUB OF THE UNITED KINGDOM

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## EDITORIAL COMMENT



OMBARDMENT from the air is a subject which has been much discussed of late, and there have been innumerable references to it in the Press. Most of the writers have assumed that there is no adequate defence against air attack, and that aerial bombers can without great difficulty destroy any large town in a night. It does not seem to these writers that it is very injudicious to rush into print on any subject until one has studied it with some care.

For a study of the subject of air attack and air defence there is no book more worthy of perusal than *Air Defence*, written a few years ago by Maj. Gen. E. B. Ashmore, who was in command of the air defence of London in 1918, yet this book has not been quoted at all in the recent floods of literature in the Press, or, if it has, the allusion has escaped our notice. The French are a people who make a serious study of war, for their history and their geographical position makes such a study a matter of interest to every French citizen. Accordingly, Gen. Ashmore's book has been translated into French by Capt. de l'Epine, and a preface has been written for the translation by no less an authority than Maréchal Pétain, the distinguished soldier who has been placed in supreme command of the anti-aircraft defence of all France. A translation of this preface appears in the August issue of the *Journal of the Royal United Service Institution*. Thus it seems that Gen. Ashmore's important work is receiving more attention among our late Allies than among ourselves—another instance of the prophet in his own country.

As was to be expected, Maréchal Pétain expresses views of his own in this preface, and these views arouse thought. He says, for one thing, very definitely, "The most potent form of defence is, of course, the indirect defence." By this he means attack by one's own bomber force. "By the bombardment of the enemy bases the hostile air raiders can be placed in jeopardy; by the threat of reprisals the aggressor may be made to stay his hand." On that dictum alone one may reflect much. In the first

## DIARY OF CURRENT AND FORTHCOMING EVENTS

Club Secretaries and others desirous of announcing the dates of important fixtures are invited to send particulars for inclusion in this list:—

- 1933.
- Aug. 26. Folkestone Aero Trophy Race.
- Aug. 28-30. Golf: R.A.F. Autumn Meeting, Camberley Heath G.C.
- Aug. 29-31. Swimming: Inter-Service Championships, Alder-shot.
- Aug. 31-Sept. 9. Model Engineer Exhibition, R.I. Horticultural Hall, Westminster.
- Sept. 1-4. International Air Races and Gordon Bennett Balloon Race, Chicago.
- Sept. 2. Norfolk and Norwich Ae.C. Garden Party.
- Sept. 2-4. Austrian Ae.C. International Air Rally, Gastein, Austrian Alps.
- Sept. 3. Maidstone Ae.C. "At Home."
- Sept. 6. Isle of Wight Air Race.
- Sept. 4-10. British Week Exhibition, Helsingfors, Finland.
- Sept. 6. Thames Valley Ae.C. Garden Party and Display at Hook Aerodrome, Kingston By-Pass.
- Sept. 9. Kent Air Pageant, Maidstone Airport.
- Sept. 16. Bristol and Wessex Ae.C. Garden Party.
- Sept. 17-24. "la Bienvenue Aérienne" at Rheims.
- Sept. 29. Stage and Screen Ae.C. Gymkhana and Theatrical Garden Party, Hatfield.
- Oct. 7-8. B.G.A. Gliding and Soaring Competition.
- Dec. 18-24. International Rally at Cairo and Meeting of the F.A.I.
- 1934.
- June 1. Entries close at 12 noon for London-Melbourne Race.
- July 3-9. 4th International Congress for Applied Mechanics, Cambridge.



place it may be noted that the great French Marshal does not say, as so many thoughtless British writers have hastily said, that "getting your shell in first" is the whole secret of air warfare. He alludes elsewhere to the possibility of surprise, but he has nothing to say about "striking at nerve centres" and terrifying the enemy population into demanding peace at any price. He speaks of bombarding the "enemy bases." The best protection for one's own population, he suggests, is the fear of reprisals in the enemy's mind.

Bombarding the enemy's bases is most certainly the best means of curtailing his power for harm. If by bases is meant aerodromes, it is a doubtful point if that can be effectively carried out in time of war. A war-time aerodrome is very easily evacuated. Repair parks, stores depôts and aircraft factories would all be admirable targets for bombs, and to destroy a number of these might have a considerable effect on the enemy's fighting power. When factories in enemy territory are attacked, however, attention cannot be concentrated on aircraft factories alone, and one's power of crippling the enemy by such tactics must depend on the numbers and efficiency of one's own bomber force.

As for the menace of reprisals, that is only another way of putting the old Roman saying *Si vis pacem, para bellum*. Of course no fear of reprisals will deter any belligerent from bombing military objectives (e.g., factories) on the other side. Both sides will pursue these tactics in any case as a matter of course, according to their respective abilities. To refrain from attacking the enemy's factories will not prevent him from attacking one's own factories. The question of reprisals only applies to attacks on the civil populations, and it is very interesting to note that in Maréchal Pétain's opinion the best protection for one's own civilians is the possession of a strong bomber force. With all due deference, we heartily agree.

The Marshal continues: "It is true that direct defensive action, that is, fighters, ground armaments, and passive defences, should not be neglected. . . . The most potent direct defence resides . . . in the fighter squadrons." The fear of reprisals will save the civil population from deliberate attack if international agreement has proved a vain defence—though we are not at all convinced that such agreement will be vain, and we remember that in the great war there was no deliberate attack on civilians by either side. But some civilians must inevitably be killed by bombs aimed at military objectives. In the great war the victims, wounded as well as killed, of the German bombs dropped on British soil numbered under 5,000 in four years of war. That did nothing to cripple the fighting power of this country, and, though every life (soldier or civilian) lost is a tragedy, still more of those tragedies are caused when the fighting men are kept short of munitions of war. What Maréchal Pétain calls our active defence must be directed to saving our factories and other military objectives from the attacks of hostile bombers. Everyone knows that it is impossible to prevent all hostile bombers from reaching their objectives. Our hope of success lies in taking such toll of the raiders and making the raiding so costly

to the enemy that he will soon desist from the policy of raiding. Maréchal Pétain admits that by 1918 the British defence had become so effective that it virtually deterred the enemy from attempting to fly over British soil, and they then turned their attention to the Paris district, which offered a "most tempting target" and which had hitherto suffered from only three air raids. Paris then had to pay the price of inexperience in anti-aircraft defence. The Paris defences, and ultimately the whole of the French defences, were thereupon based on the experience so dearly acquired by London under Gen. Ashmore.

Maréchal Pétain writes that "the chief weight of the British defences lay in their ground armament and organisation." The rapid passing on of information was, he says, the mainspring of the whole organisation. Later on he repeats that the information service is the base of all defensive organisations. Information and fighters are the two points which he stresses as of most importance. We have ourselves often pointed out that the scheme of defence worked out by Air Defence of Great Britain depends above everything on the Corps of Observers. These observers are civilian volunteers, enrolled as special constables, and when one comes to think of it, never before has such a vital task of national security been entrusted to a civilian volunteer organisation. On all the Air Exercises the work of the observers has been praised by the High Command, but we believe that the organisation is far from complete. Another of Maréchal Pétain's remarks is "there is not the least chance of any country being in a state of ever-ready anti-aircraft defence during times of peace." It would seem to be incumbent on Great Britain to be as near complete readiness as can possibly be contrived. There are many stations round the coasts which belong to the Crown, and we should like to feel that all of them were able to share with the Corps of Observers the task of reporting hostile air raids. We admit drawbacks when bodies not directly under the Air Ministry are expected to work for the Royal Air Force, and on principle we should not like to see that practice extended; but unless our voluntary organisation can be kept in a complete and continuous state of high efficiency, it seems that we are running a considerable risk.

Maréchal Pétain holds that in Gen. Ashmore's book the efficacy of aerial bombardment and the importance of the danger are systematically underestimated, while the capacity of the defence is assuredly exaggerated. He writes: "Even if we admit that the defence may have grown four times more effective, who could estimate the coefficient by which it is necessary to multiply the offensive power of modern aviation—and *a fortiori* that of the future?" Does the Marshal mean that the bombers have outstripped the fighters? In that case it behoves us to increase our bombing force without delay, so as to rely more on what he calls "indirect defence." We believe, however, that the defence has outstripped the accuracy of the bombing, and certainly future raids will have to fly very high. In that case, military targets will be harder than ever to destroy, and, as we pointed out above, our "direct defence" must have as its object the protection of military objectives.

# RETURN OF LONG-DISTANCE PILOTS

## The Arrival of Codos and Rossi at le Bourget Airport

**A**FTER taking a short rest at Rayak, Syria, where they landed on August 7, after their record-breaking flight from New York, as described in FLIGHT of August 10, the French airmen, Maurice Rossi and Paul Codos, returned to France on August 11, landing at the Istres Aerodrome, Marseilles, after flying from Rayak, some 1,250 miles, in a single hop. They were greeted on their arrival by the Air Minister, M. Pierre Cot, and prominent local officials, and remained several days in the South of France, where they attended numerous functions and several aviation meetings.

Rossi and Codos then flew to Paris on Wednesday, August 16 last, where two official receptions were given in their honour, the one on their arrival at le Bourget Airport, the other being held immediately afterwards at the Paris City Hall.

Although the day was cloudy, with intermittent showers, a large crowd assembled at the Airport to welcome the returning airmen. A good-sized detachment of the 34th Aviation Regiment was drawn up on the apron in front of the Custom House Building of the Airport, with Colonel de Mirabel in command. Major Generals Denain, Chief of the Air Force, and de Goys, the Commander of the Paris Aviation District, were also among the officers present. The Government was represented by Messrs. Edward Daladier, the Premier himself, and Pierre Cot, Air Minister.

Promptly at 4.30 o'clock, the hour set for the first official reception to take place, the streamlined Bleriot monoplane of Rossi and Codos, the *Joseph le Brix*, appeared over the Southerly end of le Bourget Airport, escorted by a squadron of the 34th Aviation Regiment machines, composed of Lioré & Olivier twin-engined, night bomber biplanes. After circling the field Codos brought his machine to a perfect landing directly in line with the apron, where the Official Party was waiting to welcome him. He then taxied forward, and on descending from the plane both Rossi and himself were carried in on the shoulders of their enthusiastic admirers.

After being greeted by the Premier, the Air Minister and other Officials present, Rossi and Codos were taken to one of the large hangars, where the first official reception was held. M. Daladier delivered the address of welcome, and congratulatory speeches were exchanged. A short luncheon was then served, at the conclusion of which the party repaired in automobiles to the Paris City Hall, where the second ceremony of welcome took place. The airmen signed the golden book and received the gold medals of the City of Paris.

The total weight of this Bleriot machine at its "take



off" at Floyd Bennett Airport on August 5 last was 8,600 kg. (18,920 lb.). The take-off runway, constructed of cement, was 4,000 ft. in length. The engine was a 500-h.p. Hispano-Suiza 12-cylinder with a compression ratio of 7:1, driving a geared (ratio 2:1) wooden four-bladed propeller. The fuel supply consisted of 6,600 litres (1,452 gallons) composed of various mixtures of petrol and benzole as follows:—

—	Petrol	Mixture	Specific Gravity
For the "take off" and first stages of flight....	1,470 litres (323 gals.)	Benzole 50%	0.810
Then successively .....	2,345 litres (516 gals.)	" 25%	0.765
" " .....	2,785 litres (613 gals.)	" 10%	0.740

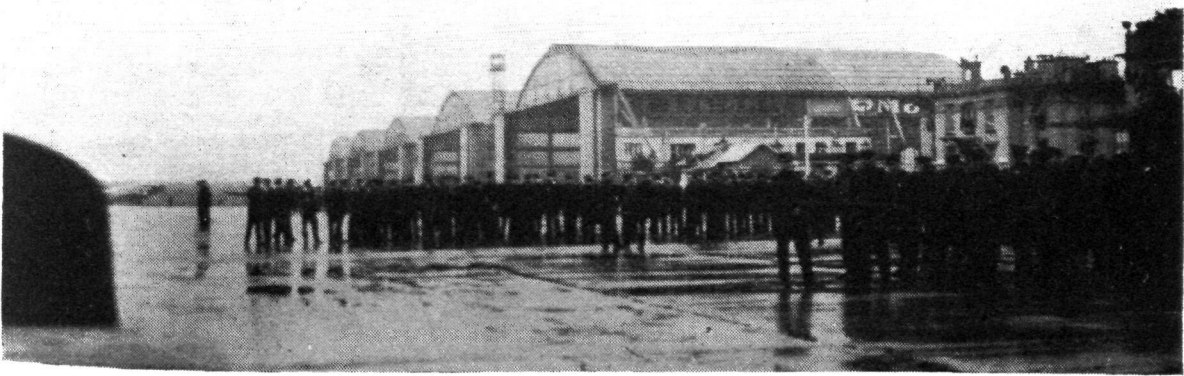
The take off of this heavily-loaded machine was one of the critical periods of the flight. The plane taxied along the runway some 3,900 ft. before taking off in the last 100 feet, and then skimmed along the surface of the water for several miles before beginning to get its altitude. The engine turned at 1,950 r.p.m. at the take off, the speed being reduced through successive stages to about 1,750 r.p.m. average as the flight progressed. The fuel consumption was about 115 litres (25.75 gals.) per hour, being considerably increased by the bad weather encountered over the Atlantic Ocean.

About 150 litres (33 gals.) remained in the tanks when the plane landed at Rayak.

Radio played an important part in this flight, Rossi receiving continual messages from the various shore stations, and sending out frequent messages himself on 34, 600, and 900 metre waves.

While official figures are not as yet available, it is expected that this new long-distance record will be homologated at about 9,200 km. (5,725 miles).

R. C. W.



WAITING IN THE RAIN: A detachment of the 34th Aviation Regiment on the apron at le Bourget, awaiting the return of Codos and Rossi.



THE "ANTARES": The engines are Pratt & Whitney "Wasps" mounted as pushers.

## FOR COAST GUARD SERVICE

### An American Flying Lifeboat

**F**OR something over a year the American Coast Guard Service has been in possession of some machines specially designed for coast guard work, and during that period they have proved their value on more than one occasion. The conditions for which these machines were designed were extremely severe, and as it is not without the bounds of possibility that some day Britain's coasts may be similarly equipped, we have thought that a description of this interesting American production might be welcomed by our readers. When the day comes for the National Life Boat Institution to "take to the air," we sincerely hope that Lord Mottistone, who will be more familiar to our readers as Gen. Seely, will be on board the first machine.

In designing the American "Flying Life Boat," the engineers of the General Aviation Manufacturing Corporation of Dundalk, Maryland, were faced with rather unusual problems. The co-operation of the engineers of the U.S. Coast Guard Service was, of course, available, and between producers and operators the type FLB-51 was evolved. Taking off from and alighting on rough water was a first consideration. Apart from the question of hull shape, this meant protecting the airscrews from spray. Consequently the monoplane type of wing structure was chosen, with two Pratt & Whitney "Wasp" engines mounted above the wing and arranged to drive pusher airscrews. This gave a position in which it is almost impossible for spray to find its way past the trailing edge of the wing on to the propellers, unless the machine "takes it over green."

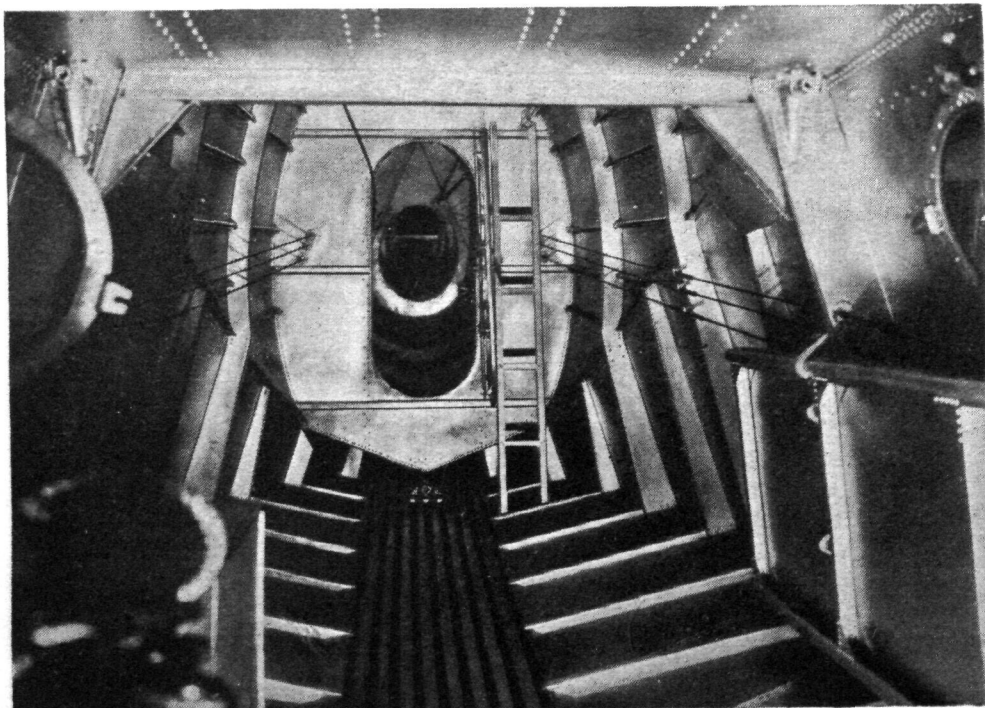
A second desideratum was ability always to return to its

base, and the machine therefore had to be so designed that it would fly comfortably with one engine stopped. This led to the adoption of two Pratt & Whitney "Wasps" for the necessary power reserve, and to the placing close together of the two engine nacelles, so that with one engine stopped the centre of thrust should not be too far removed from the centre of resistance, and the machine actually is said to require very little rudder to maintain its course with one engine out of action.

Yet a third necessity in the planning of the "Flying Life Boat" was that it should under all conditions be in wireless communication not only with its base for giving reports, but with shipping which might be sending out S.O.S. messages, or hastening to the aid of a vessel in distress. Thus the radio equipment on the FLB-51 is unusually powerful and complete.

If the operational requirements were severe, the structural problems were no less so. It was not desired to employ a greater number of structural materials than strictly necessary, but at the same time, the buffeting to which a machine of this sort might be subjected demanded the greatest possible strength. As in all other branches of engineering, a compromise had to be made, and this took the form of using Duralumin and "Alclad" for the hull and wing-tip floats, wood for the wing, and welded-steel tube construction for the tail surfaces and engine nacelle supports.

**The Hull.**—The design of the hull of the *Antares* differs from British practice in that the portion from the rear step to the stern is a fairly light *monocoque* metal structure whose function is mainly to carry the tail, but not to do much work hydrostatically or hydrodynamically. The forward portion, on the other hand, is of very sturdy construction, with watertight bulkheads dividing it into compartments so that damage to any one spot will not flood the entire hull. The reserve buoyancy is large, in the neighbourhood of 400 per cent., so that even after extensive damage the machine should keep afloat. To protect the hull against corrosion, all aluminium and duralumin parts are first anodically treated. They are then primed with red oxide and given two or three coats of pigmented varnish. The "Alclad" skin plates have bitu-



LOOKING AFT: A view inside the hull, showing watertight bulkhead, monocoque construction, etc. On right, in foreground, can be seen the stretcher bunk.



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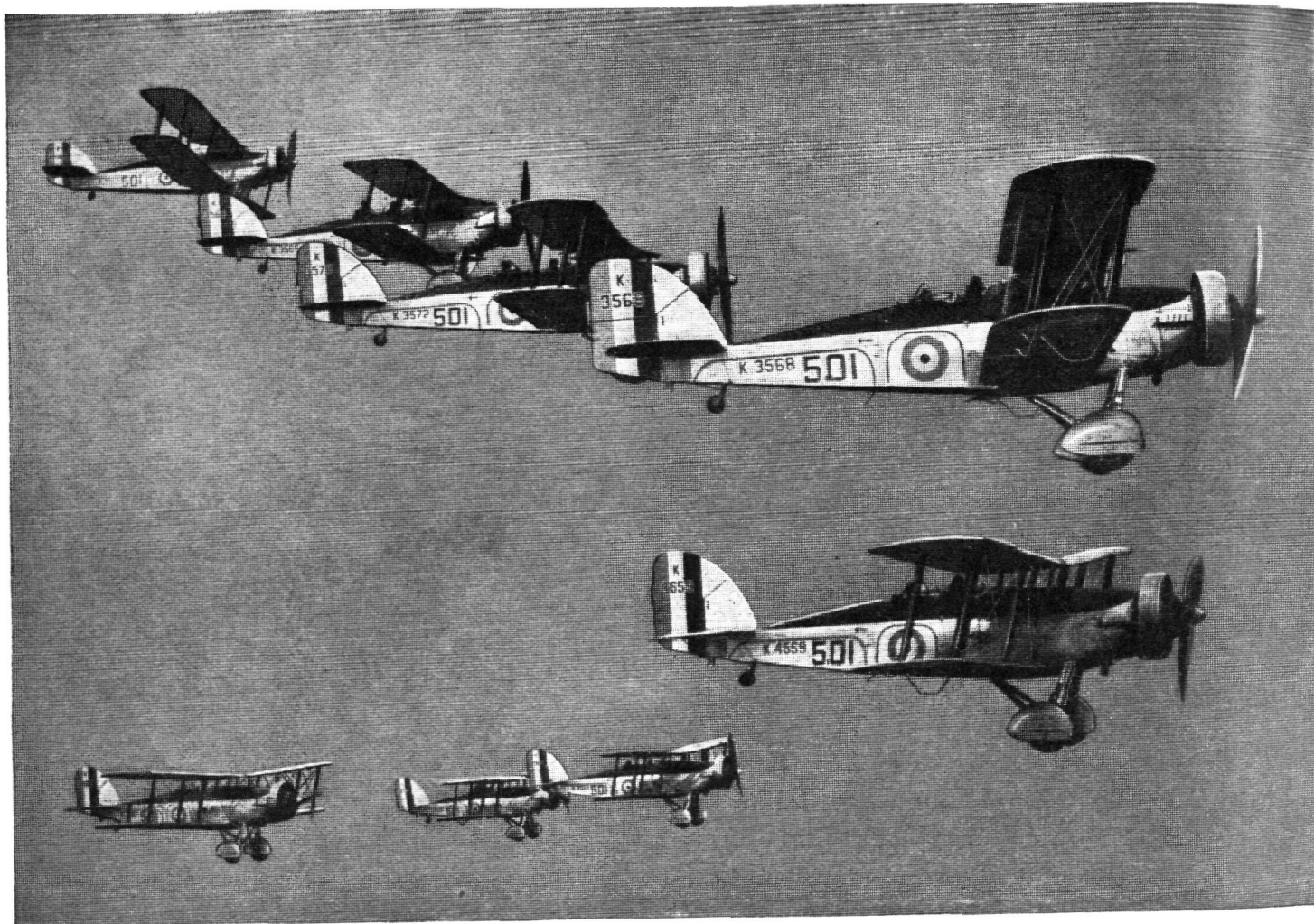
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mastically treated fabric strips interposed between the plate joints to ensure water tightness. *The Wing.*—Basically the monoplane wing is a cantilever structure, of wood construction, with two main spars to take the bending loads, and a laminated skin designed to resist torsion and the shear which is imposed by the drag forces. Spruce, birch and ash are the woods used.

*Power Plant Installation.*—The engine nacelles, of welded chrome molybdenum steel construction, are designed to take engines from 400 to 600 b.h.p. The oil tanks are housed in the bulbous noses of the nacelles, and adjustable louvres are provided in order to control the oil temperature. The petrol tanks, of which there are four, are built into the wing, each having a capacity of 110 American gallons. The fuel system includes hand priming for the petrol pumps, and the pipes to the priming system are the only fuel pipes taken through the interior of the hull, so that fire risk is very small.

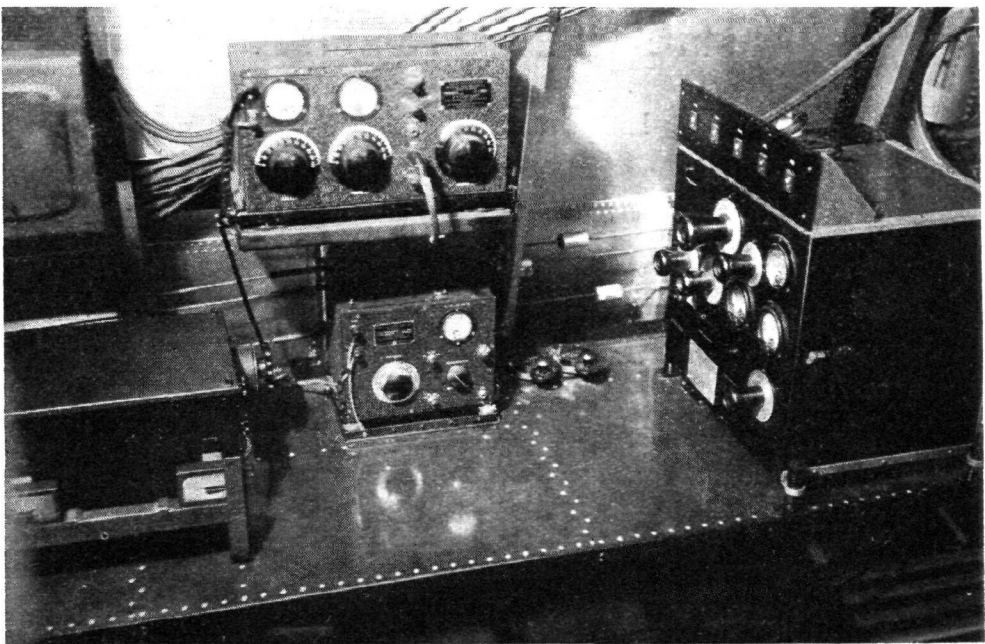
**Accommodation and Equipment**

The hull is divided by three watertight bulkheads into four compartments. In the extreme bows of the hull is a small compartment used mainly for stowing mooring gear, etc. Its opening is normally closed by a hatch cover.

Behind the mooring compartment comes the pilots' cockpit, with seats placed side by side with a gangway between them. The instrument boards are individually and indirectly lighted, and all the engine instruments are of electric type. The navigational equipment is very complete in view of the function of the machine, and the compass is supplemented by a directional gyro and an artificial horizon.

Aft of the pilots' compartment comes the cabin for the navigator and wireless operator. Tables are provided to enable these two members of the crew to work in the greatest possible comfort, and the wireless equipment itself is very complete. The electric current is obtained from an engine-driven generator charging a 65-ampere-hour 12-volt accumulator, and is used for lighting, starting, navigation lights, etc. The shielding of the entire electrical system is especially elaborate and all the leads are run through metallic casings, which are earthed at short intervals.

The third compartment is used for general utility, and in it are stretcher bunks and various life-saving equipment. The aft compartment is, of course, in the light *monocoque* rear portion, which is too far aft to permit of carrying any considerable loads, and is, in fact, merely a structural member carrying the tail.



**THE GENERAL FLB-51  
2 Pratt & Whitney "Wasp"**

*Dimensions*

	ft.	in.	m.
Length o.a. ..	53	9	16,39
Wing span ..	74	2	22,61
Overall height ..	15	6	4,73
Beam of hull ..	7	2	2,19
Wing area ..	754	sq. ft.	(70 m <sup>2</sup> )

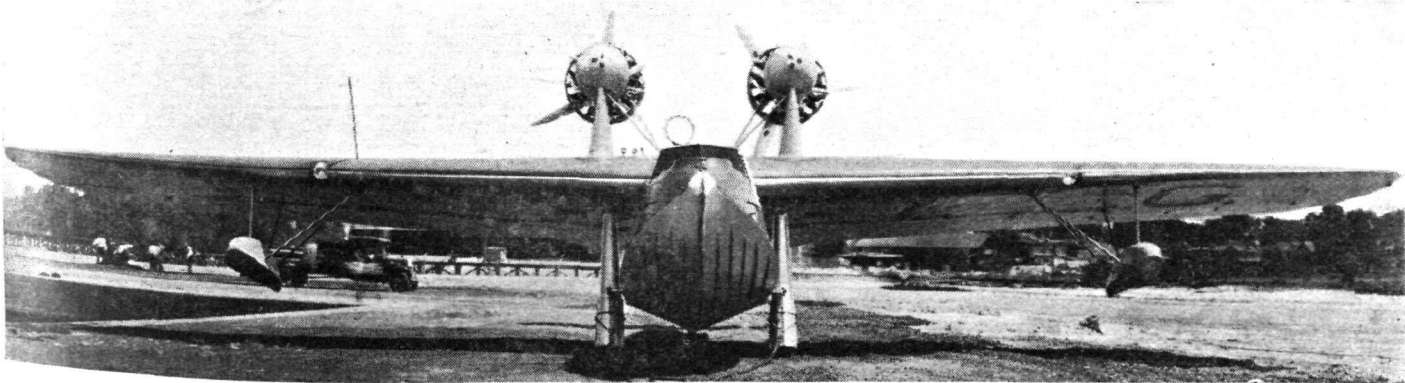
*Weights*

	lb.	kg.
Weight empty ..	7,000	3 180
Disposable load ..	4,200	1 910
Gross weight ..	11,200	5 090
Ratio gross wt./tare wt. = 1.6		

*Performance*

Maximum speed ..	112 knots (208 km./h.)
Alighting speed ..	56 knots (104 km./h.)
speed range 2 : 1	
Ceiling ..	9,000 ft. (2 745 m.)
Range ..	1,100 miles (1 770 km.)

The FLB-51 is not an amphibian in the true sense of the word, but it is equipped with a beaching trolley consisting of two low-pressure wheels carried on forked members. These members hinge around points on the front spar, and when in the "down" position are locked to the hull chines. When raised (in a fore-and-aft plane) they are partly housed in recesses in the wings.



FRONT VIEW OF "ANTARES" : The wheels are carried on large faired struts for the beaching trolley.



# THE "DEUTSCHLAND FLUG 1933"

## 150 Entrants for Big German Light Plane Trial

By E. P. A. HEINZE

**F**ROM Thursday, August 24, to Sunday, August 27, inclusive, the biggest trial of light aeroplanes yet organised in Germany will be held and conducted along very interesting lines. Eligible are only machines with at least two seats (both of which have to be occupied), and weighing no more than 560 kilogrammes (the international limit). Formerly competitions of this type attracted either the well-known cracks only, which deterred the young pilots of less experience, or only the latter, when again the famous men stood aside. Now the newly re-organised German Air Sport Union, under the presidency of the well-known old war pilot, Capt. Bruno Loerzer, has found a way to reconcile the interests of all pilots and ensure the young ones a good chance of winning despite the participation of the highly experienced men. The number of entries that has come in as a result of these new regulations is overwhelming. The competition is a purely national one, and only Germans of pure blood, with German machines, can take part, entry of machines by the clubs being, of course, encouraged.

At first the number of competing machines was to be limited to 100, and one scarcely believed this number would be reached. But, in fact, by August 1, the first closing date for entries, no fewer than 164 entries had come in. Despite the great difficulties of carrying through a trial with such a large number of competitors and a relatively small staff of experienced stewards (it always must be remembered Germany has no air force, members of which could assist), the organisers decided to admit 150 competitors.

The trial comprises a short maximum speed test to be held on August 24 from Berlin over a triangular course 50 kilometres in length. In this test the competitors will be able to collect up to 100 points. The manner in which these will be allocated is very interesting. The normal maximum speed of all types of machines to be used in the contest is, of course, known, having been ascertained by the official approbation tests of the machines. In the high-speed test competitors must attain over 85 per cent. of this known maximum speed, otherwise they will receive no points. If they attain 85.5 per cent. they will be allocated 2 points, if 86 per cent. 4 points, and so on, 2 extra points for every  $\frac{1}{2}$  per cent. more, so that a competitor reaching the full speed will receive 60 points. To encourage the clubs and individual owners to improve the aerodynamical properties of their machines of their own accord, so that their original factory maximum speed is bettered, additional points are to be given for thus obtained superspeed up to 110 per cent. of the known maximum speed of the machine type in factory trim. This brings the obtainable number of points up to 100.

On August 25, 26 and 27 follow long-distance flights, starting each day from Berlin and finishing there, the loop courses being so arranged that almost the entire country is visited. For these flights the machines will be classified in three groups, according to the average speed they were able to attain in the high-speed test just mentioned, the

speed limits for the allocation to the three groups being 135, 180 and above 180 km./hr. While the machines of the 135 km./hr. group will be required to cover daily approximately 850 kilometres (528 miles), the 180 km./hr. machines will have to travel 1,100 km. (684 miles), and the faster machines 1,500 km. (932 miles). The landing on a number of airports will be compulsory. In these long-distance flights the average speeds attained will be rated. But racing will not be encouraged. The highest number of points obtainable is 400, and this will be given when a speed 85 per cent. of the speed attained in the high-speed test is reached. Higher averages will not bring any higher points. On the other hand, machines failing to reach 60 $\frac{1}{2}$  per cent. of this speed will receive no points. The scale of points progresses by 8 points for every  $\frac{1}{2}$  per cent. higher average than 60 per cent.

Along every day's route several emergency landing places will be marked and competitors will be able to gain an extra number of points if they land on these. The whereabouts of these landing places will not be disclosed before the competition starts, in order to preclude the possibility of any competitor practising landing on these beforehand. For such landings, which are wholly optional, a total of 350 points can be obtained. The time lost in making these landings, which will be certified in a special log book the competitors will use during the contest, will be deducted from the entire flying time, so that it will not affect the calculation of the average speed.

Also optional are two night landings on Berlin Tempelhof Airport, for each of which 50 points can be obtained if they are perfectly executed without damage to the machines.

Further points can be gained by groups of competitors flying the whole three days in formation. Each competitor in a group of five machines will thus be able to gather 50 extra points, in a group of four 40 and in a group of three 30 points. Such groups have to cross the finishing line within 15 secs. after the first has crossed. But when starting, only the time the last crosses the line will be booked as starting time for the entire group, which is a small advantage. On the optional emergency landing places grouped starts will not be required.

The reliability of the machines is to be rated indirectly by each competitor being allowed a neutralised stop of 30 minutes' duration for each compulsory landing field. If he requires for work on his machine in the total more than 30 minutes, multiplied by the number of compulsory landing places, the over-time will be considered as flying time, which will detract from his average speed.

All competitors, even those who do not finish, will be granted a small mileage subsidy, which will not be less than 0.15 mark per flown kilometre. Large money awards are also offered to the entrants of machines gaining the highest number of marks. The first is to receive 10,000 marks, the second 6,000 marks, the third 3,000 marks, and the next twenty-one 1,000 marks. In addition a new light 'plane will be presented to the club which is the winning entrant, or of which the latter is a member.



### Plans of the Mollisons

MRS. MOLLISON, so we are told by Mollison himself, will, before she returns to England in about ten days time, be visiting the factory of the Smith Engineering Co., Cleveland, where she will investigate the advantages of variable pitch airscrews. If her findings are satisfactory, that is tantamount to saying that if she agrees with the advertised advantages of the makers, and if the installation difficulties, extra weight, etc., are not too great, the Mollisons will probably fit this type of airscrew on the "Dragon" for their forthcoming attempt on the world's distance record. Having adjustable pitch airscrews will undoubtedly improve their take-off and at the same time give them the means of increasing their cruising speed economically. Mollison tells us that, contrary to general

belief, he did not land down wind and overshoot the runway at Bridgeport airport, but actually undershot. Unfortunately, marshy ground ran right up to the runway, with results of which everyone is now only too well aware. He says that the visibility was very bad indeed, and the aerodrome lighting rather inadequate. Amy was with him in the front of the "Seafarer," and therefore very lucky to get away without damaging her face—a catastrophe which must be every good-looking woman's fear. The new "Dragon" being built for them should be ready in a few weeks, and will basically be the same as the previous machine. The engines will actually be the same, with one or two new cylinders replacing those which were damaged in the crash, and the general fuel arrangement will be identical.

# Air Transport

## Australia's Oldest Air Line

WEST AUSTRALIAN AIRWAYS have just acquired new headquarters, known as Airways House, in St. George's Terrace, Perth, the heart of the commercial life of the city. It is over 11 years since West Australian Airways commenced operations with a hangar on the Perth Esplanade. The northward service to Derby was begun with six Bristol "Tourers" with "Puma" engines. In time these gave place to the D.H.50, and later to the D.H.61 ("Giant Moth"). The latest change is to introduce D.H. "Dragons" on the northward service. The first "Dragon" was due to arrive at Perth on July 21.

The *Airways Bulletin* for July recalls that from the one single hangar on the river foreshore the ground organisation has expanded to include two big hangars at Maylands aerodrome, fitted with a complete range of machinery for all classes of aircraft work, hangars at Geraldton, Carnarvon, Port Headland, and Broome on the northward service, and at Forrest and Adelaide on the eastward service.

The company operated the first Perth flying school from 1927 until the school became a branch of the Australian Aero Club. Aerial photography, survey, and rescue and relief work have all been carried out.

With its two lines, one Perth-Wyndham and one Perth-Adelaide, the company have operated over 3,500 miles of airways. The machines have flown in all 2,650,515 miles, carried 52,513 passengers, 162,961 lb. of mails, and 799,237 lb. of freight. Considering that the northward service runs over thinly populated grazing tracts, this is a very fine record.

Recently the company announced a reduction of return fare rates to the winter level on the Perth-Adelaide service, so that it became cheaper to travel between Perth and Adelaide by air than by any other first-class passenger service. The company announce that this concession has resulted in a gain of 40 per cent. in passenger traffic and an increase of more than 20 per cent. in revenue.

## Dewoitines for "Air France"

ONE of the outcomes of the "Air France" amalgamation will be to put the new Dewoitine (three 650 h.p. supercharged Hispano engines) on to the London-Paris air line. The machine is said to have a cruising speed of 186.4 m.p.h.

(300 km./p.h.). It will later be used on the Paris-Karachi route and, probably by flying direct from Paris to Athens, it is hoped to do the journey in 3½ days. When on this route, the Dewoitine will only have accommodation for eight passengers instead of the 24 it carries in Europe. The route to Karachi will continue to go through Beirut and Baghdad and then via Karachi ultimately to Saigon. An extension is being projected either from Rangoon or Saigon to Hong Kong. A Commission has left for South America to confer on the question of flying the South Atlantic instead of carrying the mails by boat as is at present done.

## A Prague-Bucharest Service

A NEW air service is shortly to be inaugurated in Czechoslovakia in accordance with an agreement signed some months ago with Rumania. The flights will be between Prague and Bucharest via Uzhorod in Carpathian Ruthenia, at present the terminus of the Czechoslovak State Lines cross-country service. Test flights will be made this month, and it is hoped that a regular service of three flights weekly in both directions will be inaugurated in September.

## Calcutta Air Mail

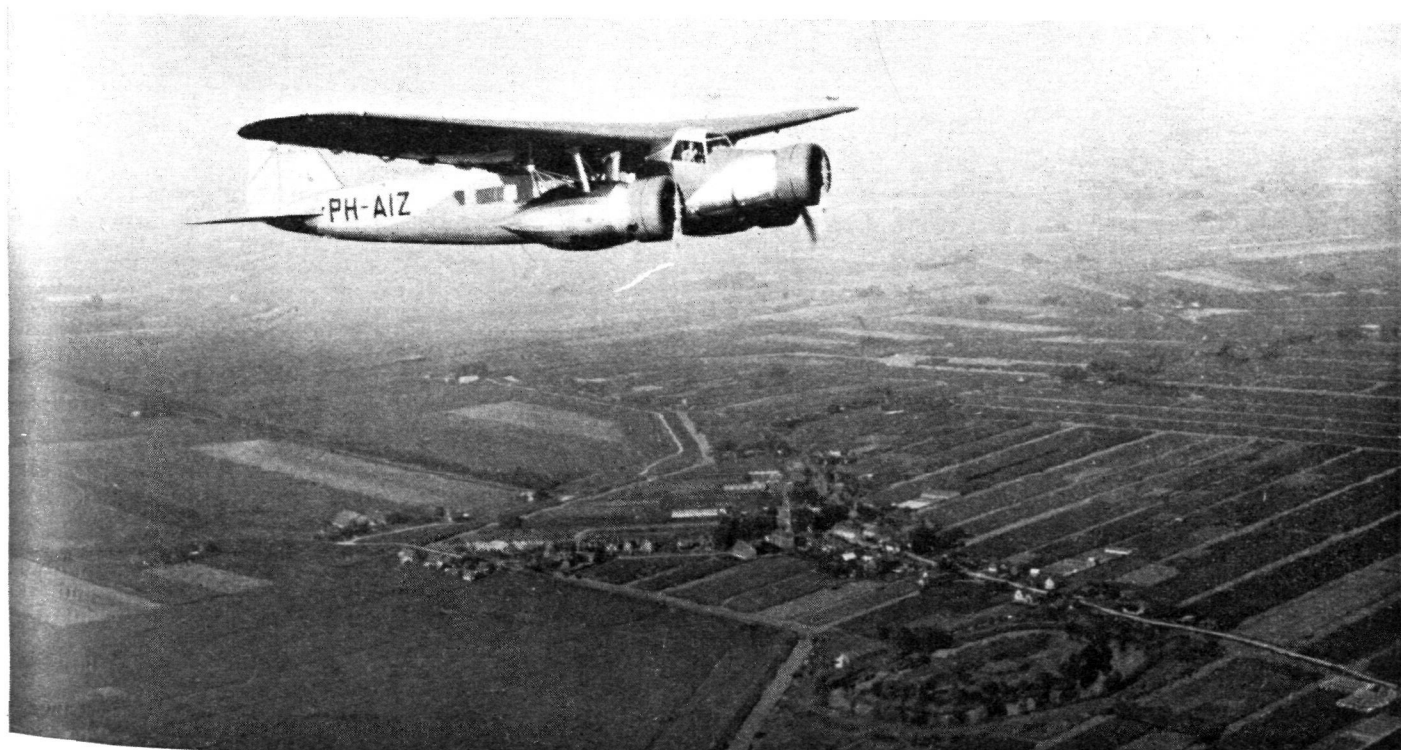
THOSE sending letters to India by air mail should remember that there is a new air mail link between Karachi and Calcutta, and that all letters for Calcutta should have an extra 2d. stamp.

## New Aerodrome at Lake Bourget

WORK was begun, on August 15, on a large new aerodrome on the shores of Lake Bourget, opposite Aix-les-Bains. A Parliamentary credit of 11,500,000 francs (about £135,300) has been voted for the project. This new aerodrome will shorten the air route to Cannes and Nice, which at the present time goes round by Marseilles. It is quite possible that in the near future Aix-les-Bains will be made into a large port for seaplanes.

## Dublin-Liverpool Service

MIDLAND & SCOTTISH AIR FERRIES, LTD., opened a new route between Hooton Aerodrome, Liverpool, and Baldonnel, Dublin, last week, using an Avro "Ten" for the



UNDER TEST : The Fokker F.XX has an undercarriage which retracts into the engine nacelles.

service. Leaving Hooton at 10 a.m., the machine reaches Dublin an hour and a-half later; taking off again for Hooton at noon. A second aircraft, an "Airspeed Ferry," is to be put into service on the route during this week. The service appears to be well patronised by both business men and tourists, who appreciate the brevity of the trip. The ordinary route by steamboat from Dublin to Liverpool takes all night.

## Imperial Items

IMPERIAL AIRWAYS have found the traffic so heavy on the African route that the "Hannibal" type is now being used on the first stage from Cairo to Kisumu; thence to the Cape "Atalanta's" are used, with D.H. 66's when it is found necessary to run a duplicate service, which apparently frequently happens.

"HORATIUS," one of the H.P.42 class used by Imperial Airways at Croydon, has recently been fitted with Bristol "Pegasus" engines instead of the "Jupiter X.F.B.M." previously installed. The greater power of the new engines has bettered both the take-off and the cruising speed considerably.

IMPERIAL AIRWAYS' special charter department recently took a party of four ladies for a four-day tour of England's seaside resorts. This tour was the prize in a competition organised by the makers of Lingford's Baking Powder.

## Empire and World Air Routes

ACCORDING to figures recently published there are 60,000 miles of regular air routes in Europe. The world total is 200,000 miles. Of the 60,000 miles of European air routes 2,000 miles are operated by British lines. The British Empire totals just on 20,000 miles.

## Graf Zeppelin

ON Tuesday night, August 15, the *Graf Zeppelin* arrived at Friedrichshafen from South America carrying 16 passengers and 105 kilogrammes of mail. Owing to the success of this service during the summer, an additional journey has been arranged, the *Graf Zeppelin* leaving Friedrichshafen in about a week's time.

## I.O.M. to the Highlands

BRITISH FLYING BOATS, LTD., have arranged trips which will enable the inhabitants of the Isle of Man to

witness the Highland festivities shortly to take place. The first trip will be to Fort William and Portree, enabling people to see the Lochaber Games and the Isle of Skye Highland Gatherings. The *Saro "Cloud"* will leave Castletown, I.O.M., on August 28 and return on September 1. The second trip will be to Oban and Inverness for the Highland Gatherings at each of those places. The machine will leave on September 13 and return on September 17. The return fare in each case will be £10. The company is indebted to the Ford Motor Co., Ltd., for helping them out with the loan of an engine just before the August Bank Holiday. One of their Wright "Whirlwinds" with which the "Cloud" is fitted shows signs of needing repair after all the arduous work it has been put to recently. As the holidays were approaching it was decided to change the complete engine. A mechanic from Heston and one of the firm's own staff went down to Ford Aerodrome on the Friday morning, took the engine which had so kindly been lent, out of a Ford, shipped it by road and boat to Castletown, remounted it in the "Cloud," and had the machine flying again on the Monday morning. A very smart piece of work.

## G.W. Railway's Air Programme

THE Great Western Railway have announced that their Birmingham-Cardiff-Plymouth air service, which was to have ended in September, will be continued for a little longer.

## Wigram Aerodrome

EXTENSIVE improvements are being made to Wigram aerodrome, New Zealand. About 120 acres, formerly the site of the old Canterbury Aviation works, are being levelled, for incorporation in the aerodrome. It is claimed that when the work is finished Wigram will possess one of the finest aerodromes in the southern hemisphere.

## Portsmouth, Southsea and I.O.W.

THE number of passengers carried during the week ending August 17 were as follows:—

SPLITHEAD AIR FERRY between Ryde and Portsmouth	582
SHOREHAM AIR FERRY " Portsmouth and Shoreham	6
" " " " Shoreham and Isle of Wight	3
SHANKLIN AIR FERRY " Portsmouth and Shanklin	14
" " " " Ryde and Shanklin	23

# Airport News

## CROYDON

ON Thursday, August 17, 200 Sheffield people travelled to London by special excursion train and thence by motor coach to the airport, where they spent an enjoyable day, watching the arrival and departures of the Continental airliners and making an inspection of the airport, followed by flying over London in one of Imperial Airways' 42-seater airliners. There seems to be some real urge for Sheffield, which is one of our larger towns, to have an airport of its own. I understand that they have an ideal site for a municipal airport, situated within a few moments of the centre of the town by ordinary tramcar. It is hoped that the 200 now air-minded Sheffield people will help the Corporation in arriving at the right decision.

Mr. James Woods, the Australian pilot, finished his flight from Australia to England, which lasted for six weeks, by arriving at Croydon about 8 o'clock on Thursday evening, quite unexpected and without anyone to welcome him. Without any ceremony, Mr. Woods, tired and dirty from his long flight of that day from Italy to Croydon, which took him 14 hours against most unpleasant weather conditions, saw his machine safely housed in a hangar and then strolled over to the hotel, where he immediately endeavoured to get in touch with his wife.

On Friday, August 18, the German athletes who met Great Britain in a match at the White City, London, on Saturday, arrived by German airliner from Berlin.

Total number of passengers for week, 2,594; freight, 88 tons 7 cwt. "HORATIUS."

## FROM HESTON

MR. RODERICK DENMAN, Technical Director of Airwork, Ltd., has qualified for a wireless operator's licence. He hopes to carry out measurements of field strength in the air, as such information would be of value in connection with research or short-wave propagation.

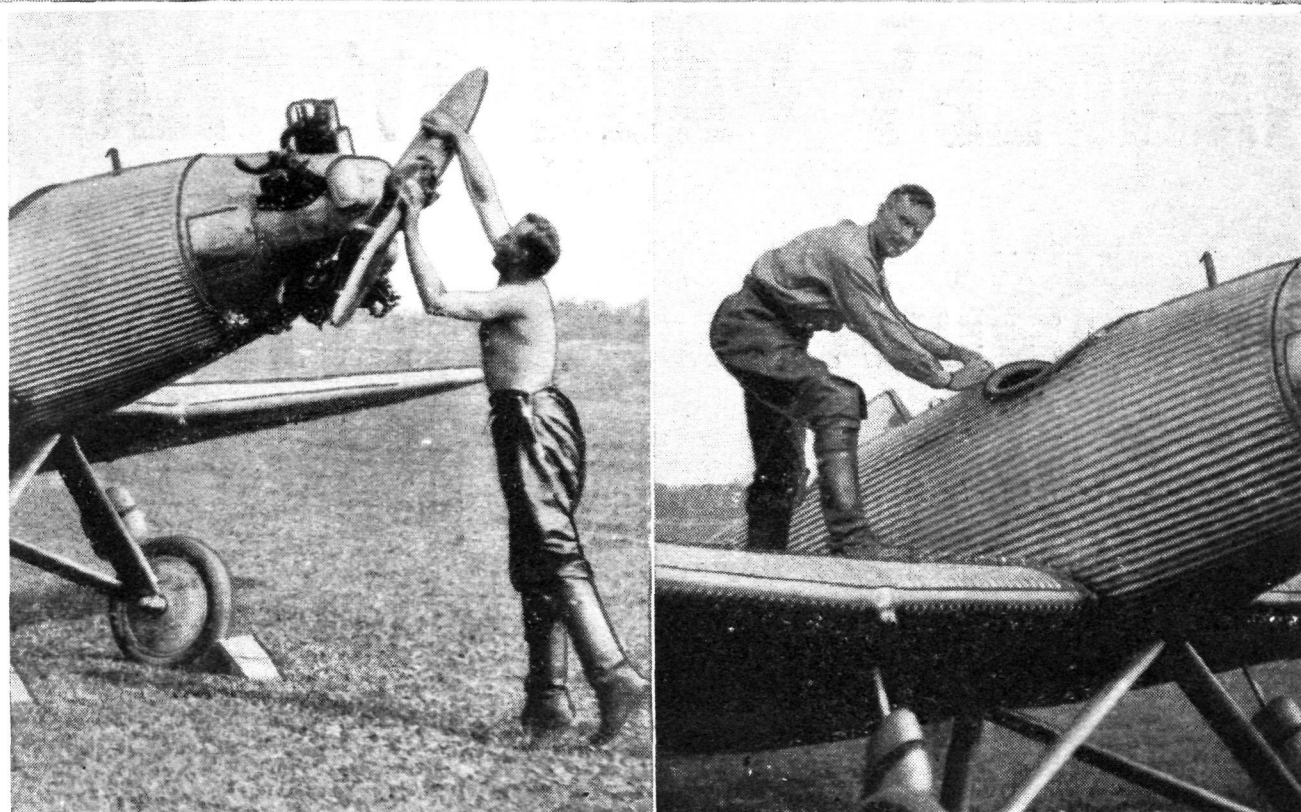
A new pupil of the school is Mr. H. E. Whatley, of the Sperry Gyroscope Co., who are having one of their own testing staff taught to fly to enable him to carry out tests of their instruments in actual flight. Another new pupil is the Assistant Provost Marshal of the London District, Capt. C. F. O. G. Forbes, of the Coldstream Guards.

Capt. Birkett left for Rome on August 10 on Press charter work in connection with the arrival of Air Marshal Balbo's fleet. Returning via Pisa, he took off from there in the dark at 4.15 a.m. Including stops for petrol at Marseilles and Lyons and at le Bourget to drop plates for the *Paris Soir*, he made the journey of nearly 1,100 miles in about 10 hours, arriving at Heston at 2 p.m. A Birkett machine landed with special permission on Smith's Lawn, the Prince of Wales's private landing ground at Virginia Water, to pick up Capt. and Mrs. Mackintosh, who flew to Lympne for a round of golf.

The British Air Navigation Co. carried Mr. Barnard Rubin to Pescara, in Italy, for the motor racing.

Cowes week gave an impetus to Spartan Air Lines. Instead of the drop in bookings, reasonably to be expected at the finish of Cowes week, they have remained at a steady high level.





CAPT. BREMER AND HIS SIDDELEY GENET JUNKERS JUNIOR

## Sixteen Thousand Miles' Flight on a Siddeley Genet Junkers Junior

CAPT. W. BREMER, THE FINNISH PILOT, RECENTLY REACHED EUROPE AT THE CONCLUSION OF HIS WORLD'S TOUR ON A SIDDELEY GENET JUNKERS JUNIOR.

THROUGHOUT THE 16,000 MILES' FLIGHT THE 80-88 H.P. ENGINE RAN PERFECTLY, MAINTAINING A CRUISING SPEED OF 85-90 M.P.H. ON A PETROL CONSUMPTION OF FOUR GALLONS AN HOUR.

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COVENTRY

ENGLAND

BP 298

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AIRCRAFT LTD.,**

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ISLE OF WIGHT.**

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# Airisms from the Four Winds

## The Prince's Holiday

THE Prince of Wales flew to Le Bourget, on Tuesday, August 15, in his private aeroplane piloted by Flt. Lt. E. H. Fielden. Later His Royal Highness left by train for Biarritz. On the return journey Flt. Lt. Fielden made a forced landing at Redhill on account of bad weather; he damaged the undercarriage slightly and broke one of the propellers.

## French Air Minister's Tour

M. PIERRE COT, the French Air Minister, is starting on a flying visit to Russia on September 8 to demonstrate French civil aeroplanes. He will be accompanied by M. Rossi and M. Codos, the long-distance record holders, and by M. Costes, M. Mermoz and M. Detroyat. Later M. Rossi will attempt to break the round-the-world record either alone or in company with M. Codos.

## Dr. Koch's Flight

DR. LAUGE KOCH, the Danish Arctic explorer, has telegraphed the Greenland Administration that he has succeeded in making an important flight over North-East Greenland. The flight lasted 9 hr. 30 min., and the most northerly parts of Greenland were flown over.

## Free State Air Exercises

COMMENCING on September 18, the manoeuvres of the Irish Free State National Army, including the Army Air Corps, will take place in the counties of Kildare, Wicklow and Dublin, when the "Blue" force will oppose the "Yellow." Both armies will have the use of aircraft and special attention is to be paid to combined tactics in the mountains of Dublin and Wicklow.

## The Austrian Air Rally

THE Austrian Aero Club has notified the Royal Aero Club that they have cancelled the Regulation calling for at least two persons in the aircraft. Entries for aircraft carrying pilot only will be accepted at single entry fee up to August 31, 1933. Copies of the Regulations may be obtained from the Royal Aero Club, 119, Piccadilly, London, W.1.

## Col. Lindbergh's Flight

COL. AND MRS. LINDBERGH arrived at Reykjavik, Iceland, from Angmagssalik, East Greenland, on Tuesday, August 15. They were met by Mr. John Grierson.

## Mr. John Grierson's Flight

MR. JOHN GRIERSON has been compelled to abandon his wireless flight to America. While attempting to take off from rather rough water at Reykjavik, on Sunday, August 20, his machine bounced badly, with the result that the starboard float struts snapped.

## Mrs. Mollison in Canada

ON Saturday, August 19, Mrs. Mollison flew to St. Hubert Airport, Montreal, to open the city's fifth Air Pageant. She was flying a "Puss-Moth" and was escorted by a flight of United States machines.

## Polish Transatlantic Airmen to Try Again

THE two Polish airmen, Benjamin and Joseph Adamowicz, who crashed at St. John's, Newfoundland, have arrived in Halifax, and are to make a further attempt to cross the Atlantic from New York to Warsaw.

## The Isle of Sheppey Tragedy

AN unfortunate accident occurred near Leysdown, Sheppey, on Tuesday morning, August 15. While No. 605 (County of Warwick, Bomber) Squadron, Castle Bromwich, who were in training at Manston, were doing aerial machine gun practice near Leysdown, a boat containing two girls was hit and one of the occupants killed.

It appears that Miss Jean Chesterton, aged 17, of Ilford, rowed out, with her younger sister, to retrieve a large ball drifting from the shore. While this boat was in the vicinity of a line of targets it was mistaken for a target by a gunner in the back seat of one of the machines who fired a burst at it.

At the inquest the Jury brought in a verdict of "Death by Misadventure," which was the only verdict any sane jury could have returned. Various suggestions were put

forward in an endeavour to prevent another such accident; no doubt the Air Ministry will do something in this direction. It does seem that the two girls were a little unwise in rowing out in the direction of the target, especially as they had watched machines firing on those very targets many times previously. The parents are worthy of the sympathy of all, they have behaved magnificently throughout. At the funeral, Lord Londonderry, Secretary of State for Air, was represented by Air. Com. E. D. M. Robertson.

## Mollisons in Big Race?

IT is understood that there is a likelihood of the Mollisons taking part in the England-Australia Race, with a "Dragon." Presumably it depends upon the outcome of their avowed intention of making a flight to America again before attacking the World's Distance Record from there in the direction of Baghdad.

## Lost Spanish Airmen

REGARDING the disappearance of the two Spanish airmen, Capt. Barberan and Lt. Collar, who flew from Spain to Havana in June, a new rumour has now appeared. It is reported that they were shot down by the orders of Gen. Machado, who was then President of Cuba. A member of Machado's secret police who has been arrested confessed to assisting in the shooting. He also has promised to take officials to the airmen's grave.

## A Matter of Geography

YORKSHIRE is a county after our own heart. Its fruitful trout streams and the restful solitude of its moors always make it loom large in our consciousness. It was probably for this reason that we credited it with possessing that charming stopping place for aviators when we placed Otterburn Hall Hotel therein last week. We hope that "Otterburdonians" will forgive us for forgetting that their hospitality was Northumbrian and that true Yorkshiremen will bear us no malice for placing this peaceful scene of many battles under their temporary jurisdiction.

## Mr. Gardner's Mishap

MR. C. GARDNER, who met with an accident at the Marseilles aerodrome when on a flight to Africa, did not suffer so much personal damage as was at first reported. He did not have to go to hospital, and in point of fact took the night train back to England after his crash. This seems to have been due to fuel pump trouble, causing one engine to cut out just after the take-off. He landed the machine immediately but ran into a ditch at the end of the aerodrome, damaging the undercarriage and causing minor damage to the bottom of the fuselage. His passenger was also unhurt.

## Flt. Lt. Schofield Ill

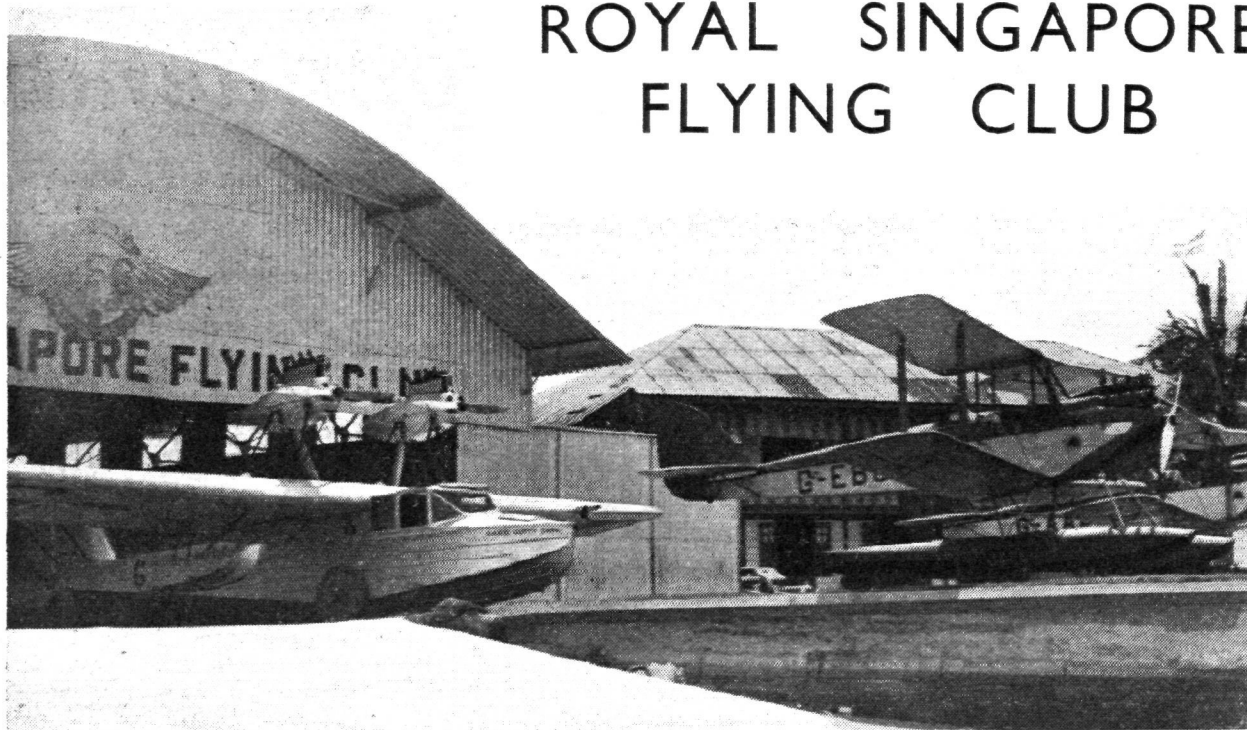
FLT. LT. H. M. SCHOFIELD, the well-known general manager of General Aircraft, Ltd., has had a recurrence of his long standing internal trouble and is at present laid up. His many friends in aviation will wish him a speedy recovery.



THE BLACKBURN "BAFFIN": This photo. shows the prototype, as indicated by the identification letters. The engine is a Bristol "Pegasus." (FLIGHT Photo.)



# ROYAL SINGAPORE FLYING CLUB



**I**N spite of the fact that the weather during the period January to June, 1933, was only fairly good for seaplane flying, the creditable number of 553 hr. 10 min. flying was recorded. During this period, however, the Club suffered from the fact that several of its most enthusiastic members proceeded on leave approximately at the same time.

During the month of June the 5,000 mark was reached, the total number of hours flown by the Club since its inauguration by the end of the month being 5,146. This is equivalent to approximately 350,000 miles flown, and during the period only one forced landing has had to be made owing to engine trouble.

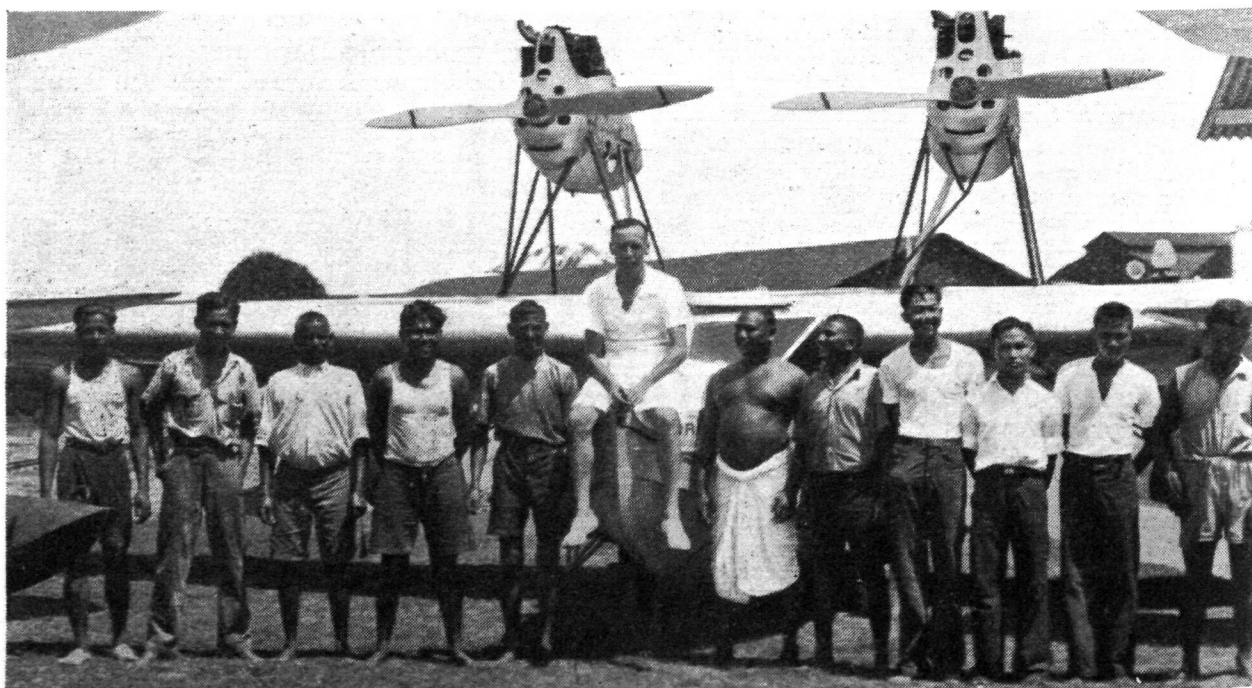
Weather conditions form the limiting factor in the amount of flying done in a Seaplane Club, and also play an important part in determining the number of hours a pupil needs to fly for his "A" licence. The average number of hours flown for the "A" licence on seaplanes in the Club has been approximately fifteen, but as an example of how this average may be reached, given good flying weather, the case of one new member of the Club may be quoted. This member had his first flight on May 28, and went solo on July 3 after 10 hours only.

**ON THE SLIPWAY: A Saro "Cutty Sark" and two "Cirrus-Moths" belonging to the Royal Singapore Flying Club.**

Records of the weather are kept at the Club, and it is now possible, with reasonable accuracy, to advise prospective members of the best time of the year to commence flying instruction with a view to keeping down to a minimum the number of hours necessary to go solo.

The reduction of the flying fees to \$9.00 per hour now enables an average member in good weather to obtain his "A" licence at a cost of approximately \$135.00, which is further reduced to \$85.00 by the Government grant of \$50.00 to each member who obtains his "A" licence. To this must be added, of course, the cost of the 3 hr. solo (\$27.00) necessary to qualify for the licence.

In the month of May the acting chief instructor, Mr. Erik Rhodes, left Malaya for England, a circumstance greatly regretted by all Club members. Mr. Rhodes had been intimately connected with the Club since its early days, and had acted in the capacity of secretary, assistant



**AN ARMY MARCHES ON ITS STOMACH:** The Napoleonic dictum might be paraphrased in modern times by saying that a club flies on its ground staff.

**TWO SINGAPORE CLUB MACHINES:** The "Cirrus-Moths" are used as seaplanes.

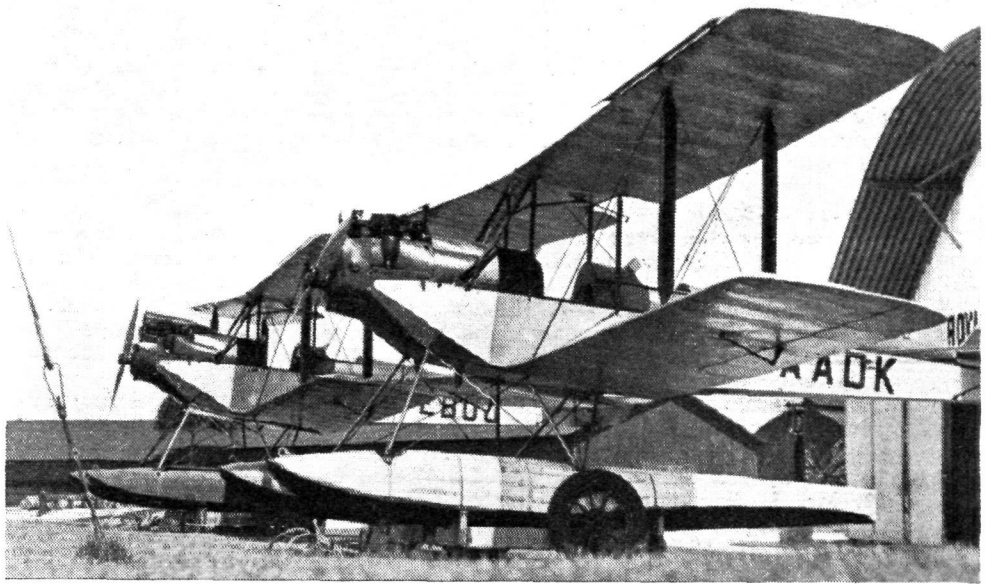
instructor, and finally acting chief instructor.

Flt. Lt. Potter, Chief Instructor, returned from leave on May 12, and took up his duties the same day.

On June 3, three Club machines, viz., two "Moth" seaplanes and the "Cutty Sark" flying boat, took part in the King's Birthday Parade and flew past in formation. On the evening of the same day, at the request of H.E. the Governor, a formation flight over Government House was carried out.

One activity of the Club, which has come to the fore in recent months, is that of the taking of aerial photographs. A notable example is a photograph of Malayan Breweries. With the sanction of the Government, photographs of features of local interest can be taken on request.

One accident, thought to be caused by the fracture of the airscrew, on a "Moth" seaplane, occurred on May 20, 1933. One of the floats was punctured when the airscrew blade left the machine, and although the machine was successfully landed, it sank soon afterwards, and was only recovered with considerable difficulty, and after long



immersion in the water. This accident necessitated the withdrawal of the Club's land "Moth" from the Johore aerodrome, and its subsequent conversion into a seaplane. A new land machine is, however, being constructed, and will be put into commission again shortly.

During the past few weeks, Club machines have acted with success as aerial targets for anti-aircraft gunners of the Volunteer Force, and on each Monday evening one machine is allotted to this duty.

Congratulations, Singapore, on a very fine report.—Ed.



## From the Clubs

### BRISTOL AND WESSEX AEROPLANE CLUB

The Bristol and Wessex Club are holding a Garden Party at the Bristol Airport on Saturday, September 16, at which all members of other clubs and private owners will be welcomed. Visitors arriving by air will be entertained to lunch, tea and a dance at the Zoological Gardens in the evening. There will be an arrival competition and other flying competitions during the afternoon. On Sunday a series of matches has been arranged. The Home Club will play the Aero Golfing Society at golf, the Cardiff Aeroplane Club at tennis and A.S.T., Hamble, at squash rackets. Air taxis from the Bristol Airport during the week have been chartered for journeys to Glasgow, Stamford, Porthcawl, Bideford and Le Touquet. Two honeymoon trips were also made from the airport.

### GRAVESEND AVIATION, LTD.

The Gravesend School of Flying have been particularly busy during the past fortnight. Messrs. J. and T. Atkins have passed "A" licence tests and Mr. Heeley has made a successful first solo flight. Cross-country flights have been done by Messrs. Ward and Mitchell. Mr. Colligan, a Scottish pupil, has unfortunately had to return home before going solo. Mr. Bloomer has joined the school and is spending his holiday obtaining an "A" licence. A new member of the school is Dr. Griffiths, who has done a considerable amount of flying with the Singapore Flying Club. Air taxis of Gravesend Aviation, Ltd., have made frequent excursions to Le Touquet. Mr. Maurice Spencer, late of the London Aeroplane Club, has now joined Gravesend as secretary-manager of the Club.

### THE THAMES VALLEY AERO CLUB

Mrs. Victor Bruce was doing a steady business joyriding at Hook Aerodrome, the venue of the newly-formed Thames Valley Aero Club, and incidentally flying beautifully, when we looked in on Sunday. The Club is well situated, being alongside the Kingston By-Pass Road,

and should attract a steady stream of new people to flying. Just before we arrived they had had the baptism ceremony of their first aeroplane, a "Moth" ("Cirrus II"), which Mrs. Light annointed with much good liquor and wished every prosperity. During the afternoon many visitors called in, including Capt. Duncan Davis, who brought over Tommy Rose, now back in this country for some time; Mr. S. Thorn, Sales Manager of Brooklands, who demonstrated the "Fox Moth"; Mr. R. A. C. Brie, who was doing some joyriding in an "Autogiro," and Mr. Mollison with Miss Pickering, both of whom were treated to flights by Mrs. Victor Bruce. The Club will be holding an Aerial Garden Party on behalf of the Surbiton Hospital on Wednesday, September 6. The Surbiton Council is, we understand, solidly behind the Club, and when the extra fields are taken in to make the aerodrome a really good one, it should prove a successful undertaking.

### LONDON AEROPLANE CLUB

Flying times for the week ending August 20 totalled 50 hr. New members are Messrs. J. W. T. Jones and H. Pound. First solos were done by Messrs. F. H. Matusch and K. Hensman, and "A" licences have been obtained by Messrs. W. S. Philcox and K. Hensman; the latter obtained his licence within three weeks of joining. He did his first solo on Saturday, and finished his tests on Sunday morning. A dart match held between the Club and the Edgware Police resulted in a win for the latter.

### SKEGNESS AND EAST LINCOLNSHIRE AERO CLUB

During the last fortnight 45 hr. solo and 27 hr. dual have been flown. Pleasure flights have been given in the "Fox Moth" and the "Puss Moth," and the Skegness to Nottingham service has been going strong, the figures being to Skegness 45 and to Nottingham 38. Among taxi flights was one to North Berwick, stopping at Cramlington for the finish of the London to Newcastle Air Race. Mr. Broughton has joined the Club and has already done



over 4 hr. flying. On Monday, August 14, a meeting was held of representatives of the Dominion Motor Spirit Co. After lunch many went up in the company's "Puss Moth." On Tuesday, August 15, Sir Alan Cobham's display was held, but was handicapped by showers and high winds. The newspaper contract with the *Leicester Mercury* for the daily delivery of their paper to Skegness has been successfully carried out.

### HANWORTH (N.F.S.)

Flying time for the week totalled 85 hr. Cross-country flights were done by Mr. Kirwan to Oxford and return; Sqd. Ldr. Leslie to Ryde; Mr. Bramson to Hull; Mr. Back to Eastbourne; Sqd. Ldr. Helmore, with Miss Dodo Watts as passenger, to Coventry and return; and Mr. von Bahr to Blackpool, Glasgow, Edinburgh, Newcastle, Leeds, Hull and Nottingham, covering 1,000 miles in 12 hr. and experiencing some very unpleasant weather, especially in Scotland. Mr. von Bahr has proved himself a very apt pupil and on Saturday, August 19, took his younger brother for a flight over London. On Wednesday, August 16, Mr. I. Ramsey carried out his tests for an "A" licence, having done his first solo four days previously. The Hon. Geoffrey Cunliffe also carried out "A" licence tests. Mr. Watson, who won a *Daily Express* Flying Scholarship, has started instruction. On August 12 two Desoutters and an "Avian" flew to Beckhampton to joyride and give an exhibition of flying at a fête organised by jockeys and trainers.

### YORKSHIRE AEROPLANE CLUB

Club machines flew about 44 hr. during the week, a spell of fine weather being much appreciated. New members are Mr. and Mrs. J. Birch, of Cleckheaton, Yorkshire, and Mr. G. R. O'Brien, of Leeds. To date 34 new members have been enrolled this year. Club machines flew to Norwich, Sywell, Bristol, Cardiff and Birmingham on taxi trips.

### NORFOLK AND NORWICH AERO CLUB

The flying times for last week created a record, totalling 38 hr. Sir Alan Cobham's Circus visited the aerodrome on Saturday, August 19. The Club wish to congratulate Mr. Crichton Boxer on winning the Club Scholarship for free instruction and solo flying for an "A" licence. Messrs. W. J. Watson, J. C. Smith, H. H. Wilson and Mrs. Wilson. Miss Henfrey took some refresher instruction. Soloists were Messrs. H. C. Stringer, S. Hansel, A. J. S. Morris, A. T. Cox, A. Kirkby, H. Birchall and Flt. Lt. J. Fogarty. On Saturday, September 2, the Club are holding an Aerial Garden Party at 3 p.m. The programme will include clay pigeon shooting, an archery competition, aerial bombing, car races and a surprise item. In the evening there will be a treasure hunt, followed by a dance.

Miss W. F. Hudd, the first woman pilot trained in Norwich, and Mr. Kirkby, the Aero Club's ground engineer, have just returned from a week's tour of the Continent. In a Club "Moth" they paid visits to Brussels, Dusseldorf, Hanover, Berlin, Leipzig, Erfurt, Frankfurt, Cologne, Antwerp and Ostend. In all 19 hr. flying were done. Miss

Hudd and Mr. Kirkby give some interesting information about flying in Germany. Commercial air transport is highly developed and cheaper than first-class rail fare. Most of the machines used are smaller than the British commercial machines; at Erfurt, a town about the size of Norwich, a 40-seater Handley Page machine created quite a sensation. There is less private flying in Germany than in England; the enthusiasm is very noticeable, but the necessary funds are not available. They greatly admired the German airports, especially Tempelhof, which is almost in the centre of the city. Wherever they went tremendous enthusiasm was noticeable on all matters connected with aviation. Miss Hudd and Mr. Kirkby were very well treated by all officials, and found Germany a most hospitable country. The total cost of the whole trip, including hire of machine, petrol and oil, was only £30.

### CARDIFF AEROPLANE CLUB

During the fortnight ending Saturday, August 19, the flying times totalled 71 hr. 35 min. dual and 26 hr. 45 min. solo. The new machine which arrived on Saturday, August 5, has already done over 50 hr. flying. Mr. C. Hay made a successful first solo on Saturday, August 12. Mr. J. E. Jurdon, a C.F.S. instructor who is on leave, has been acting as honorary instructor to the Club for the past fortnight, and gave 45 hr. dual instruction.

### THE DE HAVILLAND SCHOOL OF FLYING

Flying times for the past two weeks totalled 274 hr. Mr. James Raglan, the secretary of the Stage and Screen Sporting and Aero Club, is arranging a series of midnight bathing parties for artists after theatre hours. Last Thursday the whole companies of "While Parents Sleep" and "Ten Minutes Alibi" turned up to bathe. The R.A.F. Reserve Club have some active members who are taking the opportunity of flying at the low rate of £1 an hour. Mr. Fraenkel has joined the school for a refresher course. Flt. Lt. Cox, M.C., is taking a formation of four "Fox Moths" to Madrid.

### THE LONDON GLIDING CLUB

The favourable weather during the week-end made it possible to get in a lot of flying at the Club's ground near Dunstable. On Saturday over 15 hours were flown on club machines. Humphries flew the "Crested Wren" to Ivinghoe Beacon and back, a feat which has never before been achieved. He took 5 hr. 6 min. over the flight. On the Club's "Professor" sailplane, Mr. G. E. Collins, who was recently lent by the London Gliding Club to act as instructor for the B.G.A. gliding camp at Huish, attained a height of 1,750 ft., as recorded by a sealed barograph. This flight was officially observed and will be claimed as a British record. He also made a flight in the "Kassel 20" but without the barograph, his altimeter reading being 2,450 ft. On Sunday the conditions were better still and Mr. Dewsbury reached 3,200 ft. by altimeter, but was also not carrying the official barograph. All these altitudes are measured above the point of departure and not above sea-level. Throughout the week-end the two-seater was working hard taking passengers up, and on one occasion it is understood to have reached an altitude of about



A survey of the sites suitable for gliding in the Northern Pennines has recently been completed by members of the Aircraft Club, Harrogate. Their sailplane, the *Zephyr*, has made 55 flights, during which the range was explored from Mallerstang to Cumrew Fell. Many excellent sites were found, of which it is hoped to make further use. The *Zephyr* is now on view at Keswick, and it is hoped to make a soaring flight with it from the surrounding mountains.



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3rd July, 1933.

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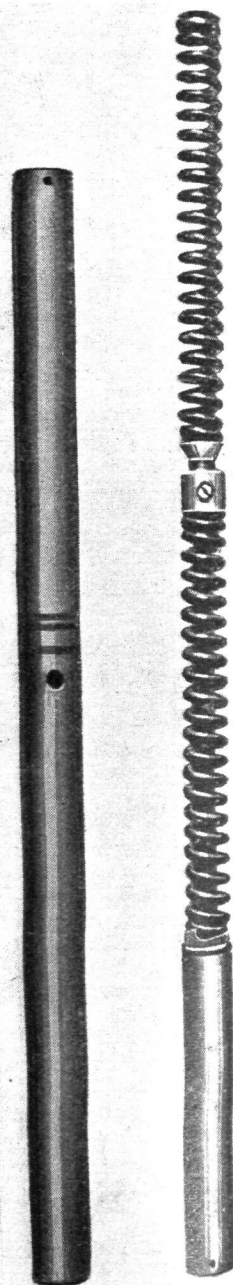
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1,500 ft. At times there were four machines in the air together, a pretty good indication of the Club's activity when it is known that on neither of these days was any primary training being done. The new winch starting gear was used for most flights. By its use machines can be started from the foot of the hill, enabling the members to get in much more flying than they would otherwise do. Having safety-first in mind, a pair of shears have been affixed to the fairlead on the winch itself so that the driver can cut the cable if, for any reason, the quick-release on the sailplane should fail to act. Two visitors came over in power-driven aircraft on Sunday, Mr.

Gordon Selfridge Junr. and Mr. Shand. Both had recently been to the Wasserkuppe and were apparently given to understand that the training they would receive at the London Gliding Club would be in every way comparable with that given in Germany. The Imperial College Gliding Club will be going into camp at Dunstable shortly. There are now a number of the Club's members who attend every day, so that there is always some flying to be seen throughout the week, when the wind is suitable. Mr. Cordes, test pilot to Handley Page, Ltd., has been doing a lot of gliding lately. One imagines that his usual work is apt to become boring after the niceties of gliding.



## Correspondence

### A CHALLENGE

[2871] May I be permitted to reply to your correspondent "An Admirer of German Aviation." His whole letter proves that he is ignorant with regard to aviation and aircraft, as pointed out by your article concerning same.

However, we must forgive him for being proud of his own country's aircraft, but I am positive that British aviators do not boast as predicted by your correspondent.

As we are unable to create a war to satisfy "Admirer," I suggest that he obtains a German machine, and that a British machine of the same horse-power be found, together with the necessary backing, and a long-distance race be arranged. I myself would be willing to fly against him to prove that our aircraft are not flying crates as he would have us believe.

W. DAVISON,

Chairman of the Air Scouts' Association.

Billingham-on-Tees.

August 12, 1933.

### AIR BOMBARDMENT

[2872] Maj. Yeats Brown, the distinguished author of *Bengal Lancer*, sends the following:—

I notice that in your editorial notes of August 3 you refer to a statement of mine with regard to the possible damage which might be inflicted on this country by hostile bombers. I should like to make it clear to you that my own opinion, which as you say is not that of an expert, is that the damage which could be inflicted by enemy aeroplanes has been greatly exaggerated, chiefly by pacifists who wish to paint modern war in the most lurid colours possible.

I feel that our Air Force, and indeed the development of flying generally, is a beneficent and civilising influence, and that another war, should such a calamity unfortunately come, would in all probability be *less* and not more horrible than the last, because it would be more quickly over.

YEATS BROWN.

*The Spectator*,  
99, Gower Street,  
London, W.C.1.

August 12, 1933.



## PUSHER ADVANTAGES

IT is to be hoped that the S.M.1, the little pusher which was fully described in *FLIGHT* as far back as May 11 this year, will go into production because the more we fly it the more fascinating it becomes. During a recent flight made since the controls have been slightly modified, we were very favourably impressed with the suitability of the machine for the average private owner who wants comfort and safety. Everything is quite normal, with the added advantage—and a very great one at that—of having an absolutely unrestricted view forward. The feeling of safety which this gives one has to be experienced to be believed, while the absence of slipstream battering one's face makes the S.M.1 quite exceptionally comfortable. These advantages, inherent in the type, added to the straightforwardness of this particular machine's controls, make an approach unusually simple and should result in a far higher standard of landing if the machine were used in flying clubs. It is often said that a pusher loses in the matter of performance. The S.M.1 does not deserve this particular form of obloquy as with the Hirth engine of less than 70 h.p. its top speed is over 90 m.p.h., while the take-off and climb are all that can be desired. At the present time

the controls are, perhaps, not quite as co-ordinated as one would like to see. The rudder is certainly lighter than anything else although very effective, while the elevators are lighter than the ailerons, making over-correction in a fore and aft direction somewhat difficult to avoid in bumpy weather. A point which is worthy of consideration by all designers is the comfort of the seats. Mr. Lee Murray, believing in comfort and the psychological effect it has on those who fly his machine, has had the seats in his Riley car copied for the S.M.1. The result is excellent and makes one feel at ease immediately one sits in the cockpit. Taken all round, we think that the S.M.1 represents the nearest approach, yet achieved in this country, to the ideal of an aeroplane suitable for those just coming into aviation and for those somewhat more elderly people who already fly. By this we do not mean that the machine is unsuitable for the younger generation, far from it. But merely that here is an aeroplane which is a delight to fly, makes one feel safe, is comfortable and in which one does not have to sacrifice performance to a noticeable degree to achieve these advantages. Flt. Lt. G. M. Buxton, who as our readers know is a bit of a wizard on gliders, was flying the S.M.1 last Sunday, and he expressed the opinion that it was the easiest machine to land, apart from a glider, that he had ever flown. Moreover, he thought it was a really "sensible" aircraft.



THE SHACKLETON-LEE MURRAY S.M.1 : The engine is a 60 h.p. Hirth.



# THE ECONOMICAL CRUISING SPEED OF THE BURNELLI ALL-WING MONOPLANE

By F. WERTENSON

We have on previous occasions (THE AIRCRAFT ENGINEER, August 29, 1930 and September 25, 1931) published articles on the aerodynamic characteristics of the Burnelli semi all-wing aeroplanes. In the following article Dr. Wertenson deals with the advantages claimed for the type as a commercial machine with high cruising speed. Readers interested in the Burnelli designs may obtain further information from Air Commodore J. A. Chamier, of Chamier, Gilbert-Lodge & Co., of 47, Victoria Street, London, S.W.1.

THE economics of air transport have recently been receiving extensive theoretical and practical consideration in the United States and abroad. It is generally recognised that air transport must advance sufficiently in the near future to make possible unsubsidised operations at a profit in competition with fast surface transportation before far greater expansion can be expected. How to accomplish this is a matter of varied opinion. It is logical that the main attention has been directed towards the design of the flying equipment, since the aeroplane constitutes the major expense item. In drawing a parallel to surface transportation, the aeroplane combines vehicle and road expenditures, and therefore it has great leverage in influencing operating costs.

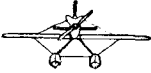


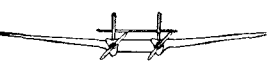
In regard to equipment requirements, the subject of one of the principal controversies is the effect of higher power loading *versus* higher speed. In some quarters it is maintained that large transports with increased pay load per horse-power and of moderate speeds will bring the required reduction in cost per ton-mile. This would make possible rates at the level required for competition with surface transport and to draw traffic therefrom, thereby greatly increasing volume. The opposite view is that air transport should strive for higher speeds and, thereby, cater to special patronage, which will pay rates in excess of those of fast surface transportation and sufficient to cover the cost of operation plus the essential profit. It is contended

that new methods of travel develop new channels of traffic, and that this would particularly apply to super-speed airways operations.

One requirement is definitely agreed upon by both groups: With either method general improvements in the efficiency of air transport equipment are required, in addition to adapting it to traffic needs in order to bring about the desired advancement.

The fundamental of equipment design is aerodynamics. Aerodynamic considerations directed attention to the so-called "all-wing" design, because in this regard it affords the highest efficiency possible with fixed wings. Due to structural reasons, and due to the general assumption that to house power plant, cargo and passengers in the wing necessitates unusually large thickness, chord and span, consideration of this trend of design has been applied only to types of large capacity and rather low speed, notwithstanding that a plane composed entirely of lifting surface would be void of parasite drag and, therefore, capable of attaining the highest speed possible.

The Burnelli plane is an all-wing plane in which only the central section is of increased thickness and chord to accommodate power plant, cargo and passengers. The outer wings are of normal thickness ratio. Investigation of the speed best adapted to present commercial needs of this design indicates that cruising speeds of 170 m.p.h. and higher are practical and economical.

Types :				
Power .. .. .	2,600	2,600	2,600	2 x 2,600
Gross weight : lb. .. .	6,000	5,400	5,400	10,800
Wing loading : lb. per sq. ft. .. .	40	30	37.5	37.5
Lifting area : sq. ft. .. .	150	180	144	288
Lifting fuselage area : .. .	—	—	—	110
Wing panel area .. .	—	—	—	178
Drag distribution :				
Area x drag coefficient				
Wing .. .. .	150 x 0.0000212	180 x 0.0000212	144 x 0.0000286	178 x 0.0000286
Fuselage .. .. .	7.5 x 0.000273	7.5 x 0.000273	7.5 x 0.000273	27 x 0.00026
Pontoons or wheels .. .	11.5 x 0.000230	4 x 0.00030	—	—
Wing .. .. .	0.00318	0.00383	0.00412	0.00505
Fuselage .. .. .	0.00205	0.00205	0.00205	0.00700
Pontoons or wheels .. .	0.00265	0.00120	—	—
Tailplanes .. .. .	0.00031	0.00037	0.00040	0.00080
Bracing .. .. .	0.00340	0.00290	—	—
Total .. .. .	0.01159	0.01035	0.00657	0.01285
Top speed m.p.h. .. .	407	422	490	495

Above table compares on a basis of equal power loading the ultimate high-speed performance obtainable by present practical designs. All types are assumed to have the same power plant, i.e., the Rolls-Royce "R" racing engine of 2,600 b.h.p. The wing loading of the seaplane is assumed heavier than for the landplane to account for pontoon weight, both using thin, wire-braced wing design. A heavier wing loading is allowed for the cantilever

wing designs in proportion to the lift coefficient increase compared to the thin-wing types, for equivalent landing speeds. The research results indicate the aerodynamic superiority of the thick cantilever wing types with retractable undercarriage. Relative structural advantages and possible weight savings are not taken into account. The twin-engine design is assumed at double the weight of the single-engined types.



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TABLE II.—AIR TRANSPORT ECONOMICS IN RELATION TO HIGHER CRUISING SPEEDS.

Weight, Performance and Operational Cost of the All-Wing Plane with Varying Power and Cruising Speed.

	h.p.	2 × 400	2 × 500	2 × 600	2 × 800
Power .. .. .	lb.	2,040	2,340	2,750	3,250
Weight of Power Plant .. .. .	lb.	4,730	4,900	5,500	5,350
Structure .. .. .	"	880	1,020	1,150	1,400
Fuel (450 miles) .. .. .	"	350	350	350	350
Pilots .. .. .	"	2,400	2,400	2,400	2,400
14 passengers .. .. .	"	10,400	11,010	11,700	12,750
Gross weight .. .. .	"	150	162	172	189
Schedule cruising speed with 2/3 rated power .. .. .	m.p.h.	64	66	68	71
Landing speed .. .. .	"	\$	\$	\$	\$
Initial price of structure .. .. .	"	30,000	31,200	32,400	34,000
" " engines .. .. .	"	12,000	14,500	16,000	20,000
Cost of operation per year—					
Depreciation of structure .. .. .	"	10,000	10,400	10,800	11,330
" of engines .. .. .	"	9,000	10,900	12,000	15,000
Maintenance of structure .. .. .	"	4,500	4,680	4,860	5,100
" of engines .. .. .	"	6,750	8,180	9,000	11,250
Insurance .. .. .	"	5,860	6,400	6,770	7,550
Pilots' pay .. .. .	"	14,400	14,400	14,400	14,400
Ground service personnel .. .. .	"	8,500	8,500	8,500	8,500
Fuel and oil .. .. .	"	9,600	12,000	14,400	19,200
Hangar .. .. .	"	4,000	4,000	4,000	4,000
Communication .. .. .	"	6,000	6,000	6,000	6,000
Traffic .. .. .	"	11,450	12,350	13,130	14,400
Administration, miscel. .. .. .	"	12,000	12,000	12,000	12,000
Total cost of operation—					
Per plane and year .. .. .	"	102,060	109,810	115,860	128,730
Per plane and hour .. .. .	"	68.04	73.21	77.24	85.82
Per plane and mile .. .. .	"	0.454	0.452	0.449	0.454
Per passenger mile .. .. .	"	3.25	3.23	3.21	3.25

The figures of depreciation, maintenance, administration, etc., are based on an average of operations of five representative air lines. The weights of the power plants with 2 × 400, 500, and 600 h.p. is based on domestic engines, the 2 × 800 h.p. installation refers to the Rolls Royce Buzzard. The initial price of the structure is varied in proportion to its weight. Further assumptions are as follows:—

Flying time .. .. .	1,500 hours per plane and year.
Depreciation .. .. .	Structure obsolete in 3 years.
	Engines worn out in 2,000 hours.
Maintenance .. .. .	Structure: 45 per cent. of depreciation.
	Engines: 75 per cent. of depreciation.
Insurance .. .. .	14 per cent. of new value, covering indemnity and limited crash.
Fuel .. .. .	11 cents per gal. of gas, 60 cents per gal. of oil.
Traffic .. .. .	In proportion to plane miles flown.

To increase the power and consequently the cruising speed has little effect on the cost per passenger mile. The final figures indicate that, with a type of the high aerodynamic efficiency inherent to the all-wing plane, cruising speeds of over 170 m.p.h. are economical and practical with multi-engine design.

What will constitute the economical cruising speed of air transport is at present highly controversial. Following the war and the establishment of commercial aviation in Europe, a number of scientific treatises were published on the subject of the most economical cruising speed. They mainly dealt with the favours of power loading and fuel consumption. The general assumption was that if the speed is increased by the installation of larger power plants, the fuel consumption per mile is higher which, combined with the power plant weight addition, reduced the pay load. These fundamentals remain as valid now as they were then, with the exception that we now more generally appreciate that fuel consumption is only one item in the total cost of airways operation, and that plane and engine depreciation and maintenance, insurance and pilots' time, traffic solicitation and patronage are main factors, too, all of which are directly or indirectly affected by the cruising speed.

The cleaner and better streamlined the design, the higher the economical cruising speed. The old war biplane with uncowed engines between the wings, of large frontal area and interference effect, necessarily was slow. To increase the speed of such designs to that of present fast commercial planes would be uneconomical if not hopeless; the weight of the engines and fuel required for that purpose would not leave any pay load. On the other hand, if we visualise one of the present fast, highly streamlined planes and replace its standard engine of 400 or 500 h.p. with one of half the power and fuel consumption, thereby doubling the power loading, what would be the result? Aside from the poor showing in take-off and climb, which could be corrected by more wing area, it would be comparable, in principle, to a bus on a smooth highway, driven by a motor-cycle engine at a speed of, say, 10 m.p.h. It would be a waste of time of equipment, personnel and

passengers. It would amount to keeping the equipment in the air to accumulate hours instead of mileage. To judge operating efficiency by reduced hourly operating expense only is incomplete. The distance covered is equally important in computing the cost per mile which is the basis of profit and loss.

The advantage of excess fairing and streamlining applied to old-fashioned designs has correctly been questioned by operating experts. Extra weight is added and maintenance difficulties increased, often out of proportion to the small amount of speed added. It is a different matter, however, if extensive improvement is the result of advanced basic design, as is the case with the all-wing plane.

Under the title "Financial Aspects of the All-Wing Plane," M. Gasperi published in *L'Aerotecnica*, January, 1932, issued by the Italian Air Ministry, a thorough analysis in which it was calculated that a commercial all-wing design transport would make possible an increase of 20 per cent. in speed and 35 per cent. in pay load without increasing the power or the weight in relation to the lifting area, thereby greatly reducing operating costs.

The design investigated and referred to is a complete flying wing of large capacity and with a cruising speed of 125 m.p.h. In following the customary conception of a full cantilever flying wing, head room is provided for power plant and passengers by employing extreme thickness ratios at the centre-section. The conclusion is reached that the all-wing plane is not of outstanding advantages aerodynamically for weights under 8 tons gross. If the self-imposed restriction to a full cantilever orthodox wing is discarded, we may conceive of a plane with a wing centre section of, say, 25 ft. chord and 5 to 6 ft. head room with two wing panels of reduced chord and normal thickness attached. This makes possible to realise the advantages of the all-wing plane referred to without limitation to sizes beyond present transport requirements, and to apply it to the immediate task of carrying moderate loads at higher speeds of, say, 175 m.p.h.

That a semi-all-wing plane is capable of very high speed achievement is illustrated in Table I, by the comparison of four high-speed design arrangements, with relative values based on the power analysis of the Supermarine Schneider Cup

Racers. It demonstrates the possibilities of the cantilever landplane with retractable landing gear, and the outstanding performance with multi-engines of the all-wing design. In critically observing the results, one must keep in mind that a thick low wing is more subject to detrimental interference effects than a thin low wing, and that less is known about its characteristics at high Reynolds numbers. The all-wing plane, with its thick centre-section, also is liable to show scale effect at high Reynolds numbers. On the other hand, the efficiency loss due to propeller torque is eliminated by turning them in opposite directions.

It would be fantastic to consider a plane with two 2,000-h.p. engines carrying only a pilot and fuel for a 200-mile race course commercially practical. However, the analysis does indicate that high speeds in general may be expected of this type of multi-engine design. A study of its commercial application is contained in Table II. It refers to a 14-passenger transport being adapted to the various installations. The cruising speed varies from 150 m.p.h. to 189 m.p.h. The corresponding changes in equipment costs and fuel consumption, etc., work out in such a way that the cost per passenger mile is almost unaffected. This indicates that it is economical to fly such a plane at the high cruising speed of 180 m.p.h.

Of course, the result of this computation does not hold without limitations, because only the major influences of the varying cruising speed are taken into account. It does not bear out its effect on patronage nor its effect on the safety. Speed in air transportation is becoming more and more important in its relation to safety. The faster the plane, the greater its available surplus power, improving take-off and climbing performance. The problem of safe full-load single-engine operation in the event of motor failure is greatly assisted by the necessarily low initial

power loading of about 10 lb. ; it gives a power load of only 20 lb. with one engine in operation, which with the wing load indicates a power condition far more favourable than exists with a more heavily loaded, slower design. Long-range single-engined designs take off with a far higher wing and power loading.

The objection of higher landing speeds will be reduced by a transport's ability to continue safe flight on one engine, and rarely ever be required to make a forced landing away from a scheduled airport or suitable landing field. The high-speed plane also can more easily avoid a fog or storm area and reach its destination before serious change of weather conditions, and is far less affected by head-winds or cross-winds. Therefore, it can maintain schedule more efficiently and navigate a course more accurately.

It is the air-travelling public who will ultimately decide this controversy by its patronage. In order further to

reduce the duration of travel, certain accommodations in the aeroplane necessarily will be limited. It introduces the question of the relative merits of reduced flying time with travelling conveniences at the airports as against large, slower air liners with accommodations aboard similar to the Pullman car. The all-wing type of design, on the grounds of aerodynamic efficiency, can be applied beneficially to either design purpose as any aerodynamic advancement benefits either load-carrying capacity or speed.

Time-saving is the main incentive of air transportation, and the fact that improved design will reduce costs with higher speeds is a most favourable indication of the great future advancement to be expected. The importance of speed being realised makes it evident that the all-wing type plane represents a means of multi-engined air transport design improvement of first order, and will permit economical cruising speeds decidedly in excess of existing orthodox designs.



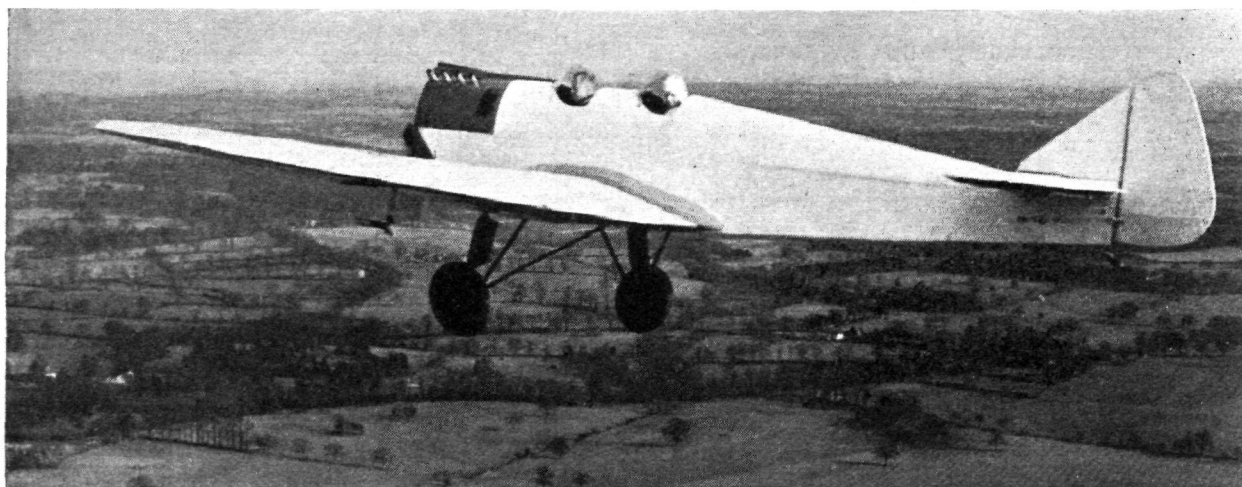
## BUILDING THE "HAWK"

**F**EW manufacturers will deny that there is often something to be learnt from the methods of those who come fresh into a business. In the aircraft trade in particular, each manufacturer regards his own methods as being, not perhaps better in a general sense, but certainly better suited to his own particular needs. Those who pride themselves on being willing to learn should take note of the construction of the new Miles "Hawk" at Reading. They will find much to interest them. A case in point is the method which Phillips & Powis have evolved for attaching glued plywood to wing ribs, wing and fuselage covering and similar places. The old method of brass tacks was slow, and moreover the tacks were apt to split the struts or longerons, besides which they served only to hold the plywood to a very small extent. Mr. Powis had a look round when he came into the game and found a wire staple machine just like that which many of us use for securing sheets of paper together, a sort of punch affair which you bang down with your fist. Now they use this at Reading for all places where plywood is glued on. In the case of the wing covering, the sheet of plywood is held in place by one man and another man goes, bang, bang, bang, along with the punch. As soon as the glue has set the staples are withdrawn, leaving a clean surface

upon which it is easy to get that high-class, motor-car-finish, which goes such a long way towards selling aeroplanes nowadays. The staples are left on inside the fuselage or on the wing ribs, not because the glue is not adequate but chiefly to save labour, though, of course, the staple in itself is better for holding the plywood on than an ordinary tack. We imagine that the saving of weight over tacks must also be quite considerable.

The factory has about double the floor space it started with, and orders are in hand which will keep them busy for a very long time. The jigs have been laid out for the fuselage, wing spars, wing assembly, fuselage sides, and all the small covered units, so that in point of fact production from them is ahead of final assembly.

The whole job is really rather impressive from a constructional point of view. Its ruggedness, combined with the natural apparent strength of the low-wing type, makes it look a very safe aeroplane, a factor which should assist its sales considerably, particularly as it is designed for those who are newcomers to aviation. The difficulty with aeroplane production is, as presumably in most other productions, that the designer, being enthusiastic about his work, goes on making improvements so that the wretched engineer finds it almost impossible to get down to economical methods.



**THE PROTOTYPE :** This picture of Mr. Miles flying the first "Hawk" was taken some time ago, and certain changes have been made in the Production Model, notably the fitting of an undercarriage incorporating Dowty shock-absorber legs. (FLIGHT Photo.)



### A Return to the Fold

OUR old friend, "Tommy" Rose, who has been out of the country for some considerable time, has now returned. He is at present disengaged, but by no means adverse to devoting his amazing energy to aviation in the way we remember of him. He can be found for the present c/o Capt. Duncan Davis, at Brooklands,

### Another School

FLT. LT. MAX FINDLAY, who as already announced in our columns is temporarily acting as one of the instructors at Brooklands, will, if his plans mature satisfactorily, shortly be starting up a flying school on his own. The venue will surprise most people and will prove the inherent "go-aheadness" for which Max has become so well known.

# THE ROYAL AIR FORCE

London Gazette, August 15, 1933.

## General Duties Branch

The follg. flight cadets having successfully passed through the R.A.F. College, Cranwell, are granted permanent commns. as Pilot Officers with effect and with seny. of July 15:—B. H. Becker, B. A. Chacksfield, T. J. Moseley, J. Y. C. Badger, R. R. Fairweather, G. N. Hancock, W. D. Disbrey, A. F. R. Bennett, D. Finlay, K. A. Stewart, C. T. Weir, A. H. Jarand, C. F. Pearce, G. A. V. Knyvett, W. B. Murray, K. Gray, H. R. Tidd, P. L. Donkin, A. C. P. Carver, M. D. Thunder, L. G. Levis, J. A. P. Owen, D. H. Spencer, P. W. Bale, R. G. Watson, G. E. Peacock, A. D. Ferguson, M. A. Aylmer, N. C. Jones, I. H. D. Walker, J. A. Hotham.

The follg. Pilot Officers are promoted to rank of Flying Officer:—W. P. Harvey (July 11); F. W. Dixon-Wright (July 28).

F/O. N. W. Mackenzie takes rank and precedence as if his appointment as Flying Officer bore date June 19, immediately following F/O. A. R. Glen-cross on the gradation list—reduction takes effect from June 19; Flt. Lt. W. F. Dry is placed on half-pay list, Scale A, from Aug. 11 to Aug. 12 inclusive; Flt. Lt. C. H. Tighe is restored to full pay from half-pay (Aug. 1); Wing Com. A. H. S. Steele-Perkins, O.B.E., is placed on retired list at his own request (Aug. 8); Sqd. Ldr. G. G. A. Williams is placed on retired list (Aug. 10); Flt. Lt. F. C. T. Rowe is placed on retired list on account of ill-health (Aug. 14); F/O. R. H. Preller resigns his short service commn. (Aug. 10); F/O. E. J. Gracie is dismissed the Service by sentence of General Court Martial (June 19); F/O. E. A. Kayser is cashiered by sentence of General Court Martial (Aug. 9).

## Accountant Branch

Flt. Lt. M. H. Luker is placed on half-pay list, Scale A, from July 15 to July 30 inclusive.

## ROYAL AIR FORCE INTELLIGENCE

**Appointments.**—The following appointments in the Royal Air Force are notified:—

### General Duties Branch

**Squadron Leader** R. S. Booth, A.F.C., to Special Duty List, 8.8.33, for Navigation duties at the Admiralty Compass Observatory, Slough.

**Flight Lieutenants:** L. P. Moore, to Marine Aircraft Experimental Estblt., Felixstowe, 8.8.33. H. F. G. Southey, to H.Q. Wessex Bombing Area, Andover, 7.8.33. W. Wynter-Morgan, to Air Armament School, East-

## Vacancies—R.A.F. Aircraft Apprentices

The Air Ministry announces:—245 Aircraft Apprentices between the ages of 15 and 17 are required by the Royal Air Force for entry into the schools of technical training at Halton, Bucks, and at Cranwell, Lincs. They will be entered partly by competitive examination and partly by "Direct Entry" (on presentation of an approved first school certificate). Entry from both sources will take place in January, 1934.

The competitive examination will be conducted at numerous local centres on November 7 next. The sons of officers, warrant officers and Senior N.C.Os. of the three Services will receive special consideration. Full information regarding the examination, the methods of entry and the apprenticeship training scheme generally can be obtained upon application to the Secretary, Air Ministry (Aircraft Apprentices Department), Gwydyr House, Whitehall, London, S.W.1.

Successful candidates will be required to complete a period of 12 years' regular Air Force service from the age of 18, in addition to the previous training period. At the age of 30 they return to civil life but will normally be given an opportunity to enter the R.A.F. Reserve for four years and to draw a gratuity of £100. A proportion, limited by the requirements of the service, may be permitted to re-engage to complete time for pension.

The scheme offers a good opportunity to well-educated boys of obtaining an apprenticeship course (normally of three years' duration) of a high standard followed by interesting technical employment. Already more than 8,000 aircraft apprentices have completed their training at the technical schools of the Royal Air Force.

The skilled trades at present open to boys are those of fitter, wireless operator-mechanic, and instrument maker. These are the most important in the Royal Air Force. The apprentices are given a thorough training in their trade by highly qualified technical instructors and their general education is also carried on during the same period by a staff of graduate teachers.

During the training period the present rate of pay is 1s. a day for the first two years and 1s. 6d. a day thereafter until the apprentice has both attained the age of 18 and been posted to a Unit on completing his apprenticeship training. When he is posted to a Unit for duty as an aircrewman the commencing rate of pay at present varies from 3s. 6d. to 5s. 6d. a day (24s. 6d. to 38s. 6d. a week) according to the marks obtained in the passing-out examination. He also receives free board and lodging and an allowance for uniform. Subsequently, there is the prospect of promotion subject to his having passed certain prescribed tests.

A few apprentices of special promise are granted free cadetships at the Royal Air Force College for training for commissioned rank.

For the remainder, opportunities arise later to volunteer to qualify in flying and become airman pilots. About 100 of the latter are selected annually from volunteers of all trades. From amongst airman pilots a few are periodically selected for commissioned rank.

## India General Service Medal

Operations on the North-West Frontier of India, 1930-31, and in Burma, 1930-32.

The Air Ministry announces:—His Majesty the King has been graciously pleased to command that the India General Service Medal, 1908, in silver (bearing on the obverse His Majesty's new Crowned Effigy), with clasps as

## Airmen's Canes Again

AN amendment to King's Regulations and A.C.I. shows that further consideration has been given to the vexed question of canes for officers and airmen. The latest

## Legal Branch

Wing Com. D. L. Ingpen is placed on retired list on account of ill-health (Aug. 11).

## ROYAL AIR FORCE RESERVE RESERVE OF AIR FORCE OFFICERS

### General Duties Branch

W. M. R. Griffin is granted a commn. as Pilot Officer in Class A (June 27); F/O. M. C. Dudding is promoted to rank of Flt. Lt. (July 1); Flt. Lt. F. C. B. Greene is transferred from Class A to Class C (Aug. 10). The following Flying Officers are transferred from Class A to Class C:—E. V. H. Jarvis (July 6); P. Bailey, J. C. Houston, M.C. (Aug. 10); S. Jones, D.F.C. (Aug. 14).

F/O. G. E. Langdon is transferred from Class C to Class AA (ii) (July 19); the commn. of Pilot Officer on probation A. I. Stockings is terminated on cessation of duty (July 8). The following Flying Officers relinquish their commns. on completion of service:—E. M. S. Spence (Feb. 6); W. A. Cooke, J. E. Davies, C. H. Morgan, A. J. Thompson (July 8).

Sqd. Ldr. W. L. Shaw, M.B.E., relinquishes his commn. on completion of service and is permitted to retain his rank (June 17, 1931) (Substituted for Gazette, Dec. 1, 1931).

## AUXILIARY AIR FORCE

### General Duties Branch

No. 601 (COUNTY OF LONDON) (BOMBER) SQUADRON.—P/O. P. J. Clive is promoted to the rank of Flying Officer (Mar. 27).

church, 5.8.33. T. G. Bird, to No. 2 (A.C.) Sqdn., Manston, 7.8.33. F. Boston, to No. 100 (B) Sqdn., Donibristle, 10.7.33. A. H. W. J. Cocks, to Special Duty List, 8.8.33, for duty at Royal Aircraft Establ., S. Farnborough. A. D. H. Foster, to No. 25 (F) Sqdn., Hawkinge, 8.8.33. J. A. Gray, D.F.C., to H.Q., Wessex Bombing Area, Andover, 1.8.33.

**Flying Officers:** The undermentioned are all posted to the Home Aircraft Depot, Henlow, with effect from 9.8.33:—G. F. Alexander, M. Q. Candler, R. P. Cauthery, L. Crocker, R. C. Kearny, D. W. Lane, K. P. Lewis, B. N. Matson, H. L. Messiter, J. T. Mynors, and W. F. Pharazyn.

detailed below, shall be granted, provided the claims are approved by the Air Council, to personnel of the Royal Air Force who took part in the operations on the N.W. Frontier of India during 1930-31 and in Burma during 1930-32.

The medal with clasp "North-West Frontier 1930-31" will be granted to officers and airmen who served under the command of Group Captain (now Air Commodore) H. Le M. Brock, C.B., D.S.O., between April 23, 1930, and March 22, 1931 (both dates inclusive), and also to authorised public and private followers.

The medal with clasp "Burma 1930-32" will be granted to those officers and airmen who participated in the operations in Burma between December 22, 1930, and March 25, 1932 (both dates inclusive), i.e., to certain personnel of Nos. 36 and 205 Squadrons (Far East Command).

Individuals previously awarded the medal will receive clasps only.

Officers no longer serving may obtain a form of application from the Secretary, Air Ministry, Adastral House, Kingsway, London, W.C.2., and airmen no longer serving, from the Officer-in-Charge, Record Office, Royal Air Force, Ruislip, Middlesex. When completed, the form should be forwarded direct to the Secretary, Air Ministry.

## Temporary Closing Down of No. 2 Flying Training School

No. 2 Flying Training School, Digby, will commence to close down with effect from July 29, 1933. The aerodrome will be maintained as an emergency landing ground only. Petrol and oil will not be available. The care and maintenance party will consist solely of personnel from the Works and Buildings Directorate. Airmen's married quarters will be occupied by the families of airmen overseas, under arrangements to be made by the Officer i/c Records.

No. 24 (Communications) Squadron moved from Northolt to Hendon on July 10, 1933, and will be administered by Headquarters, No. 1 Air Defence Group, through Station Headquarters, Hendon, with effect from that date. The Home Communication Flight now located at Hendon will be absorbed into No. 24 (C) Squadron. A detached flight of No. 24 (C) Squadron will remain at Northolt, and this flight will be administered by Headquarters, Fighting Area, through Station Headquarters, Northolt. No. 24 (C) Squadron at Hendon will be responsible for providing flying facilities for the officers of the Air Ministry and Headquarters, Inland Area. The detached flight at Northolt will be responsible for providing similar facilities for Headquarters, Air Defence of Great Britain, Headquarters, Fighting Area, and the Royal Air Force Depot.

## Move of No. 13 (Army Co-operation) Squadron

No. 13 (Army Co-operation) Squadron moved from Netheravon to Odiham on July 24, 1933.

## R.A.F. Staff Course

The dates of the terms of the R.A.F. Staff Course, 1934, are as follows:—1st Term, January 22 to April 6; 2nd Term, May 7 to August 3; 3rd Term, September 24 to December 20. Officers undergoing the course will join on the evening of January 21.

edition of the regulation runs:—"Canes will not be carried by officers when in uniform or by airmen on duty. When off duty an airman may, at his option, carry a cane of the regulation pattern." This should justify a gala night in the corporals' mess.



## AIRCRAFT COMPANIES' STOCKS AND SHARES

**D**URING the past month holiday influences made for a reduction of business in the stock and share markets, but a firm tendency was maintained in most sections, and this week prices moved in favour of holders, sentiment having benefited from further indications of improvement in the general trade position. Prominent shares of aircraft and allied companies have been a strong and active feature on attention drawn to market views that aircraft companies are having a favourable experience, and that results for the current year are likely to make a good showing with larger dividends in some cases. Imperial Airways have remained firm. The report is usually issued next month, and there are continued hopes in the market that despite the conservative policy invariably followed by the directors there will be a small increase in the dividend. Fairey Aviation were 2s. higher on balance. It was mentioned in these notes on the last occasion that in view of the large margin of profits over the dividend in the previous year and the saving now effected by the redemption of the debentures, anticipations of a larger dividend are already current, although the results are not due until December. De Havilland recovered on Monday an earlier decline in the previous week. Handley Page preference improved from 9s. to 10s. 6d. The decision with regard to an interim dividend on the last named falls to be announced towards the end of next month. Last year, it may be recalled, there was no interim, but the final dividend was 10 per cent., the same as the total for the previous year. Rolls-Royce were a prominent market feature, having moved up during the month from 52s. 6d. to 57s. 6d., which is a new high "record." The rise is attributed partly to market rumours that the aero engine side of the business is doing well. Armstrong-Siddeley preference improved nearly 1s. to around 21s.; on the basis of last year's profits the dividend on these preference shares is

Name	Class	Nominal Amount of Share	Last Annual Dividend	Current Week's Quotation
Anglo-American Oil	Deb.	Stk.	5½	101½
Armstrong-Siddeley Develop.	Cum. Pref.	£1	6½	21/-
Birmingham Aluminium Castg.	Ord.	£1	5	27/-
Booth (James), 1915	Ord.	£1	15	64/6
Do. do.	Cum. Pref.	£1	7	27/6
British Aluminium	Ord.	£1	5	30/9
Do. do.	Cum. Pref.	£1	6	23/9
British Celanese	Ord.	10/-	Nil	17/1½
British Oxygen	Ord.	£1c	6½	34/3
Do. do.	Cum. Pref.	£1c	6½	26/3
British Piston Ring	Ord.	£1	12½	42/6
British Thomson-Houston	Cum. Pref.	£1	7	26/3
Brown Brothers	Ord.	£1	10	40/6
Do. do.	Cum. Pref.	£1	7½	28/9
Dick (W. B.)	Cum. Pref.	£10	5	117/6
De Havilland Aircraft	Ord.	£1	2½	23/9
Dunlop Rubber	Ord.	c	4	35/3
Do. do.	"C" Cum. Pref.	16/-	10	25/6
En-Tout-Cas (Syston)	Def. Ord.	1/-	Nil	-/6
Do. do.	Ptg. Pfd. Ord.	5/-	Nil	2/9
Fairey Aviation	Ord.	10/-	10*	25/6
Firth (T.) & John Brown	Cum. Pref.	£1	6d	6/-
Do. do.	Cum. Pref.	£1	5½d	6/-
Ford Motor (England)	Ord.	£1	Nil	26/-
Fox (Samuel)	Mt. Deb.	Stk.	5	82½
Goodyear Tyre and Rubber	Deb.	Stk.	6½	104
Handley Page	Ptg. Pref.	8/-	10	10/6
Hawker Aircraft	Ord.	5/-	B	13/10½
Do. do.	Red. Cum. Pref.	£1	B	18/9
Hoffmann Manufacturing	Ord.	£1	5	22/-
Do. do.	Cum. Pref.	£1	7½	23/9
Imperial Airways	Ord.	£1	3	29/-
Kaysers, Ellison	Ord.	£5	Nil	50/-
Do. do.	Cum. Pref.	£5	6	70/-
Lucas (Joseph)	Ord.	£1	20	96/3
Napier (D.) & Son	Ord.	5/-	Nil	5/6
Do. do.	Cum. Pref.	£1	7½	22/6
Do. do.	Pref.	£1	8A	15/7½
Petters	Ord.	£1	Nil	7/6
Do. do.	Cum. Pref.	£1	7½G	10/-
Roe (A. V.) (Cont. by Armstrong-Siddeley Devel., q.v.)	Ord.	£1	—	—
Rolls-Royce	Ord.	c	10	57/6
Smith (S.) & Sons (M.A.)	Def. Ord.	1/-	Nil	4/6
Do. do.	Pt. Pfd. Ord.	£1	7	43/9
Do. do.	Cum. Pref.	£1	7½	24/4½
Serck Radiators	Ord.	£1	12½	41/-
"Shell" Transport and Trading	Ord.	£1	7½*	52/6
Do. do.	Cum. Pref.	£10	5	£11½
Triplex Safety Glass	Ord.	10/-	25	59/-
Vickers	Ord.	6/8	4	7/1½
Do. do.	Cum. Pref.	£1	5*	20/9xd
Vickers Aviation (Cont. by Vickers, q.v.)	—	—	—	—
Westland Aircraft (Branch of Petters, q.v.)	—	—	—	—

\* Dividend paid, tax free. c £1 unit of stock. d Last xd. March, 1931.  
A Last xd. September, 1931. B Issued this year. F 10/- paid. G Last xd. July, 1932.

covered nearly three times over. Brown Brothers remained firm and are little changed on the month, assisted by the possibility of an increase in the interim dividend which falls to be announced next month, but there would apparently be little surprise, in view of the conservative policy invariably followed by the directors, if all questions of an increase were left until the final dividend. Hawker Aircraft issues were higher, Petters preference receded to 10s. and have changed hands around this level. D. Napier issues are the same as a month ago, with the exception of the 7½ per cent. preference, which are better at 22s. 6d., compared with 22s. The interim dividend on the 8 per cent. preference is normally due next month, but the market is not apparently looking for a resumption of dividends on this class of capital at this stage. Among shares quoted at provincial centres, British Piston Ring and Serck Radiator moved up at Birmingham on the possibility of larger dividends. Firth & John Brown preference were better at Sheffield. Triplex Safety Glass again were one of the most active shares last week, but after passing the £3 level the quotation was lowered on Monday on the news of the death of the company's chairman. The report is expected this week.

## BRIEFLY

A USEFUL test of stability was given the D.H. "Dragon" recently, when Capt. Hubert Broad flew one back from the Midlands. He found that he was able, after trimming the machine, to leave the controls untouched for half-an-hour.

GENERAL AIRCRAFT, LTD., at Croydon, are now turning out "Monospar" aeroplanes at a steady rate. They have recently been investigating the question of saving time and unnecessary labour in a scientific manner. The result has been complete reorganisation in the factory. The general layout has been altered, and the work now goes through on direct and well defined routes, thus conserving money and energy. An extra bay of the Croydon hangars will shortly be taken in for space in connection with the Service department.

MOTOR BOAT engines are now being made by the Cirrus-Hermes Engineering Co., Ltd., in addition to their well-known "Hermes" aero engines. The latter have, incidentally, been giving amazingly regular service in the hands of some of the joy-riding pilots who are at present touring the country. As any pilot knows, there is nothing more trying to an engine—or an aircraft for that matter—than joy-riding day after day. British Hospitals Air Pageants, Ltd., for example, have several "Hermes" engines in Spartan three-seater aeroplanes, a combination which has given the greatest satisfaction through the whole tour.

## NEW COMPANIES REGISTERED

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## Change of Name

AGNI SPARKING PLUGS, LTD. (Waddon Factory, Stafford Road, Croydon Aerodrome, Surrey).—Name changed to Wizard Sparking Plugs, Ltd., on July 25, 1933.

## AERONAUTICAL PATENT SPECIFICATIONS

Abbreviations: Cyl. = cylinder; i.c. = internal combustion; m. = motor. (The numbers in brackets are those under which the Specification will be printed and abridged, etc.)

### APPLIED FOR IN 1932

Published August 24, 1933

- 7,320. BENDIX AVIATION CORPORATION. Ignition systems of i.c. engines. (396,146.)  
10,304. H. JUNGHANS. Fuse for anti-aircraft shells. (396,171.)  
16,197. FAIREY AVIATION CO., LTD., and A. G. FORSYTH. Superchargers for i.c. engines. (396,203.)  
21,574. FAIREY AVIATION CO., LTD., M. J. O. LOBELLE and F. C. BRAY. Welded joints for tubular structures. (396,225.)  
30,610. E. P. and J. A. GIRARD and R. EMICH. Rotary i.c. engine. (396,253.)  
36,247. U. ANTONI. Balloons. (396,277.)

### APPLIED FOR IN 1933

Published August 24, 1933

- 11,428. W. MESSERSCHMITT. Undercarriage for flying machines. (396,347.)  
14,878. F. B. HALFORD. Valve gear for i.c. engines. (396,355.)  
15,828. F. W. HILL. Sighting-apparatus for guns for use on aircraft. (396,108.)

# Personal

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### To be Married.

**S**HOLTO-DOUGLAS : DENNY. — The engagement is announced, and the marriage will take place quietly early in September, between Group Captain W. Sholto-Douglas, M.C., D.F.C., R.A.F., eldest son of Capt. R. Langton Douglas, 2, Hill Street, Berkeley Square, W., and Joan Leslie, only daughter of Col. H. C. Denny, C.B., and Mrs. Denny, 17, the Avenue, Colchester.

### Married.

**T**HORNTON : UPSON. — On August 17, 1933, very quietly in London, FLIGHT-LIEUTENANT H. N. Thornton, R.A.F., to Mrs. L. Upson.

### Births.

**M**OTE. — On August 11, 1933, at "Beechcroft," Anglesey Road, Alverstoke, to Joan, wife of Flying-Officer P. J. Mote—a daughter.

**O**UTRAM. — On August 15, 1933, at Rillbank, Forest Drive, Keston Park, to Betty (née Munro), wife of Mr. Charles Outram, R.A.F.—a son.

**S**NELLING. — On August 14, 1933, at the Nelson Hospital, Wimbledon, to Kathleen (née Gray), wife of L. H. Snelling, R.A.F.O.—a daughter.

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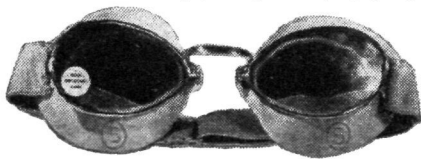
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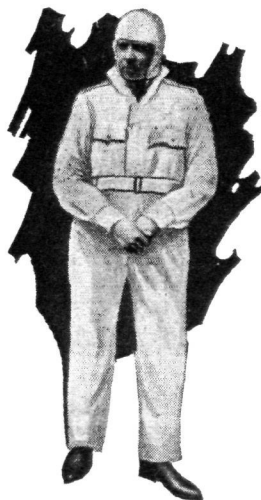
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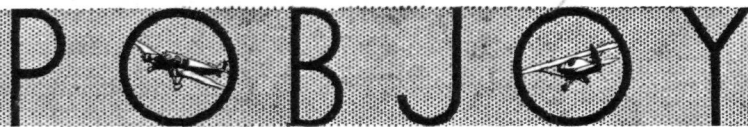
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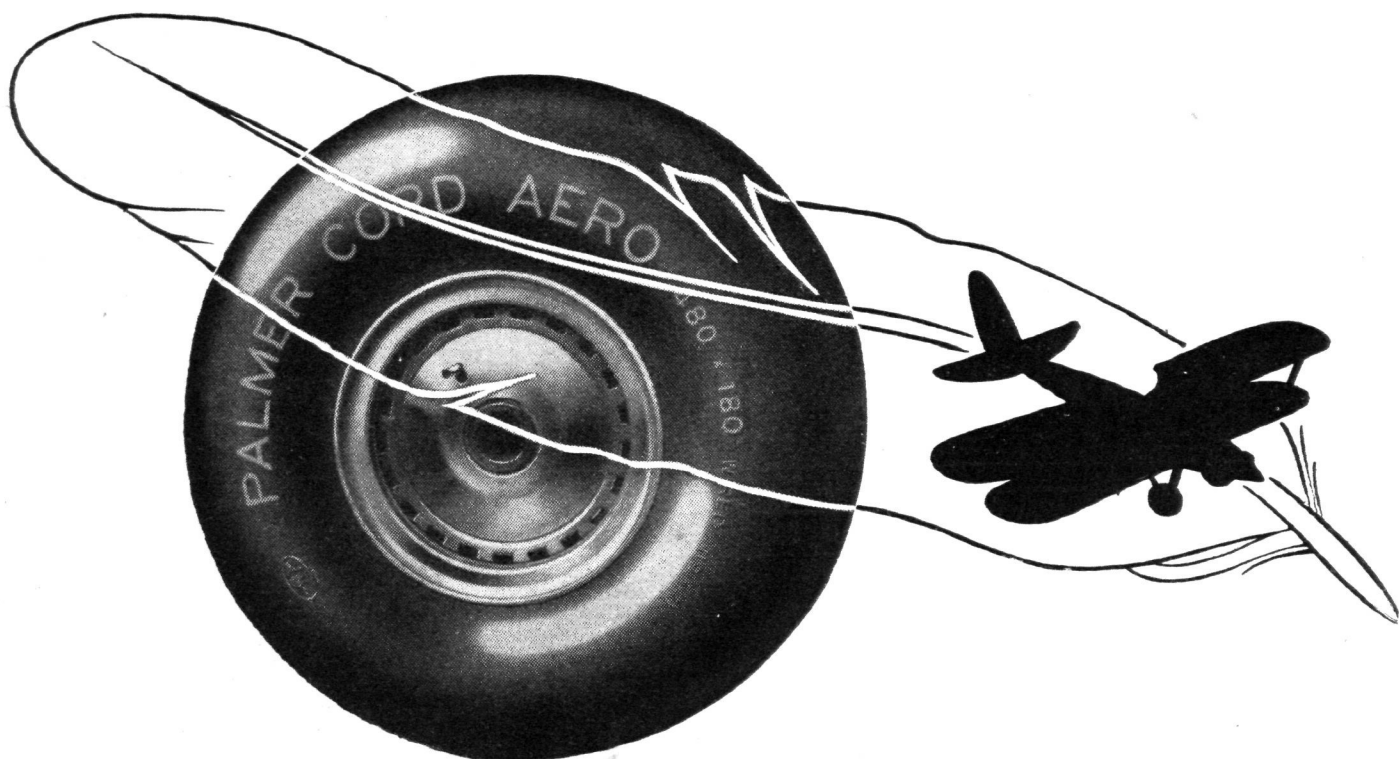
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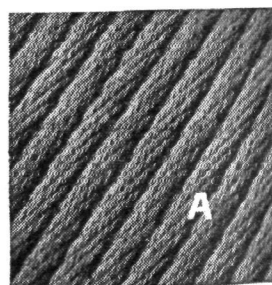
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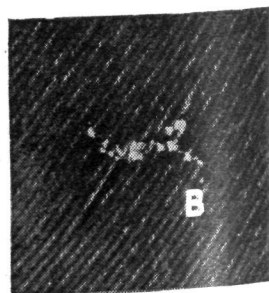


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